# SECTION 6.1 AIR QUALITY PERMIT REQUIREMENTS
## (WAC 463-42-385)

### 6.1.1 PROJECT DESCRIPTION

This section provides the background information for a Notice of Construction and Application for Approval (NOC) for the installation of pumping and storage facilities associated with the proposed Cross Cascade Pipeline. Olympic Pipe Line Company (OPL) is proposing to construct a 231-mile pipeline which will span the state of Washington. The proposed pipeline will originate on OPL's existing north/south pipeline just north of the King-Snohomish county line near Thrashers Corner and will extend to the east across Snoqualmie Pass into Kittitas County, generally following the BPA powerline and I-90 corridor. The pipeline would cross under the Columbia River downstream of the Wanapum Dam and enter Grant County before turning south to terminate at Northwest Terminalling Company's existing terminal in Pasco, Washington. See Figure 2.1-1 for a general project vicinity map. This application will focus on two potential sources of air emissions: (1) air pollutant emissions from the proposed Kittitas Terminal; and (2) fugitive emissions from the pump stations along the pipeline route.

A distribution and storage facility located in Kittitas is also proposed for this project. The terminal layout design is shown in Figure 6.1-1. The Kittitas Terminal will include ten aboveground storage tanks to be built over a 5 to 10 year period. Initially, six tanks will be constructed, while the four remaining tanks will be constructed upon demand. For this application, emissions estimates are based on the presence of ten tanks at the facility. A list of tanks, capacities, and constituents is provided in the following subsection. The tank numbers are arbitrarily assigned in this section to accommodate differentiation between tanks. The tank numbers on the layout correspond to the same tank numbers in each table in this analysis. Each tank design consists of a fixed external cone roof with an internal floating roof (also referred to as a deck). A main loading rack area will allow for the loading of two tanker trucks simultaneously. Each loading rack contains five product-loading arms. A vapor recovery system with a designed capture efficiency greater than 99.9 percent is proposed for the loading rack operations.

FIGURE 6.1-1 - KITTITAS TERMINAL

One auxiliary loading rack is also proposed at the Kittitas Terminal. This loading rack will be used only for unloading ethanol from tanker trucks into the ethanol storage tank, loading tanker trucks with jet fuel, and loading tanker trucks with the contents of the transmix tank (a tank used for storage of fuels which have mixed in the loading process). A main pump station would also be located at the terminal facility, and estimated fugitive emissions for the pump station are included in the overall calculations for the terminal facility. This facility is classified under the Standard Industrial Classification (SIC) code of 4925. The SIC code for the pipeline and pump stations is 4613.

In addition to the pump station proposed at the Kittitas Terminal, five pump stations are proposed along the route. They will be located in Thrasher, North Bend, Stampede, Beverly-Burke, and Othello. Each pump station will utilize a pair of electric pump/motor combinations, of which valves, flanges, and pump seals are expected to be the main sources of fugitive emissions. Proposed pump station site layout maps are presented in Figures 6.1-2 through 6.1-6.

FIGURE 6.1-2 - THRASHER STATION - CROSS CASCADE PIPELINE

FIGURE 6.1-3 - NORTH BEND STATION

FIGURE 6.1-4 - STAMPEDE STATION - CROSS CASCADE PIPELINE

FIGURE 6.1-5 - BEVERLY-BURKE STATION - CROSS CASCADE PIPELINE

FIGURE 6.1-6 - OTHELLO STATION - CROSS CASCADE PIPELINE

An NOC from the Department of Ecology is required for the Kittitas Terminal while the facility will not be required to submit a Prevention of Significant Deterioration (PSD) permit because the potential emissions will not exceed major emission thresholds (100 tons per year of regulated pollutant). Because the facility is requesting emission limitations on the potential to emit from the Kittitas Terminal, neither the PSD permit or a Title V Air Operating Permit will be required. Ecology's PSD Applicability Checklist is provided in Appendix D as it is required for all new sources which potentially emit measurable amounts of pollutants. It should be noted that the Kittitas Terminal is the one facility associated with this project which requires the NOC. The pipeline and pumping stations are separate, noncontiguous sources and are not part of the NOC application for the Kittitas Terminal. However, information is presented in this section for all potential sources associated with this proposal so that determinations can be made regarding each proposed facility.

Sources of air emissions at the Kittitas Terminal include losses of air pollutants associated with the storage tanks at the facility, truck loading losses occurring during the loading of fuels into tank trucks at the main loading racks, and fugitive emissions of air pollutants from valves, pipeline connections (flanges), and pump seals. For this NOC, analysis of fugitive emissions along the pipeline route is limited to leaks at the pipeline valves, flanges, and pump seals located at the pump stations. Leak detection along the pipeline route is addressed in Section 2.9 Spill Prevention and Control Measures.

The pipeline's point of termination in Pasco, Washington is an existing terminal operated by Northwest Terminalling. This facility is currently permitted for storage and transfer operations, and receives product via truck transport and barge. The delivery of product from the proposed pipeline will not increase the amount of product being delivered to this facility; only the method of delivery will be altered. The only equipment at the Pasco facility which will be owned and operated by OPL is a metering station and relief valves with few emissions. Because this facility is owned and permitted by a separate entity, alterations to the Pasco facility are not included in this application. If any permit application or alteration will be required to the facility it will be dealt with accordingly by the owner. Fugitive emissions from the Pasco delivery facility are included in Section 6.1.5.2

The main pollutants of concern during the operation of the pipeline facilities are the emissions of total Volatile Organic Compounds (VOCs) and toxic air pollutants associated with the fuel types transported through the pipeline and stored at the Kittitas terminal. Both construction and operation impacts of the Kittitas Terminal, pump stations, and pipeline route will be addressed.

### 6.1.2 REGULATORY REVIEW

#### 6.1.2.1 Ambient Air Quality Standards

In accordance with the Clean Air Act and its amendments, national ambient air quality standards (NAAQS) have been established by the Environmental Protection Agency (EPA) for several criteria pollutants: ozone ($O_3$), carbon monoxide (CO), sulfur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), and particulates with aerodynamic diameters of less than 10 microns ($PM_{10}$). Ambient air quality standards have also been established for the State of Washington (WAAQS) by the Department of Ecology (Ecology). Ecology has retained a total suspended particulate (TSP) standard which was rescinded by the EPA upon promulgation of the PM10 standard. These pollutants and air quality standards are presented in Table 6.1-1. Some of these pollutants are subject to both "primary" and "secondary" standards. Primary standards are designed to protect human health with a margin of safety. Secondary standards are established to protect the public welfare from any known or anticipated adverse effects associated with these pollutants, such as soiling, corrosion, or damage to vegetation.

Areas having concentrations greater than established standards are identified as nonattainment areas for that particular pollutant. Nonattainment areas are required to establish compliance plans, referred to as State Implementation Plans (SIPs), to ensure that the area will meet and maintain these standards by dates established by the EPA. Areas where pollutant concentrations are below air quality standards are considered in attainment for those pollutants. Certain areas where little ambient air quality data is known have not been designated and are referred to as unclassified areas. The Kittitas Terminal is located in unclassified areas for all established criteria pollutants

**TABLE 6.1-1**

## AMBIENT AIR QUALITY STANDARDS AND PSD SIGNIFICANT EMISSION RATES

| Pollutant | NAAQS Primary | NAAQS Secondary | WAAQS | PSD Significant Emission Rates (tons/year) | PSD Class I Increments (ug/m3) | PSD Class II Increments (g/m3) |
|---|---|---|---|---|---|---|
| Total Suspended Particulate Matter (TSP) | | | | | | |
| Annual Geometric Mean ( μg/m)$^3$ | NA | NA | 60 | 25 | NA | NA |
| 24-hour Average ( μg/m$^3$) | | | 150 | NA | | |
| Inhalable Particulate Matter (PM10) | | | | | | |
| Annual Arithmetic Mean ( μg/m$^3$) | 50 | 50 | 50 | 15 | 4 | 17 |
| 24-hour Average ( μg/m$^3$) | 150 | 150 | 150 | NA | 8 | 30 |
| Sulfur Dioxide ($SO_2$) | | | | | | |
| Annual Average (ppm) | 0.03 | | 0.02 | 40 | 2 | 20 |
| 24-hour Average (ppm) | 0.14 | | 0.10 | NA | 5 | 91 |
| 3-hour Average (ppm) | | 0.50 | | NA | 25 | 512 |
| 1-hour Average (ppm) | | | 0.40[a] | NA | NA | NA |
| Carbon Monoxide (CO) | | | | | | |
| 8-hour Average (ppm) | 9 | | 9 | 100 | NA | NA |
| 1-hour Average (ppm) | 35 | | 35 | NA | NA | NA |
| Ozone ($O_3$) | | | | | | |
| 1-hour Average (ppm) [b] | 0.12 | 0.12 | 0.12 | 40 | NA | NA |
| Nitrogen Dioxide ($NO_2$) | | | | | | |
| Annual Average (ppm) | 0.05 | 0.05 | 0.05 | 40 | 2.5 | 25 |

Note: Annual standards never to be exceeded; short term standa rds not to be exceeded more than once per year unless otherwise noted.

μg/m$^3$ = micrograms per cubic meter; ppm = parts per million

(a) Also, 0.25 not to be exceeded more than twice in seven days
(b) Not to be exceeded on more than 1.0 days per calendar year as determined under the conditions of Chapter 173-475 WAC

In air quality analyses, it is important to distinguish between pollutant emissions and pollutant concentrations. Emission regulations limit the amount of a particular air pollutant per unit of time that can be emitted from a stack or facility (e.g., 10 pounds per hour of particulate matter). Ambient air quality standards limit concentrations (parts per unit volume) of certain air pollutants in the outdoor air (in parts per million [ppm] or millionths of a gram per cubic meter of air [$\mu g/m^3$]). In Washington, Ecology limits facility emissions and controls ambient concentrations of air pollutants through the PSD and New Source Review (NSR) programs. Relevant regulations governing emissions and concentrations of air pollutants through the NSR permit process are discussed below.

### 6.1.2.2 Prevention of Significant Deterioration

Prevention of Significant Deterioration (PSD) regulations were established by the EPA to ensure that new or expanded sources of air pollution do not cause a significant deterioration in air quality in areas which currently meet ambient standards. EPA has created a list of 28 major source categories by which types of facilities are classified for PSD regulations. The threshold for determining whether a facility is a major source, and therefore subject to PSD regulations, is whether a facility which falls within one of the 28 listed categories emits greater than 100 tons per year of any criteria pollutant; or whether a facility not listed emits greater than 250 tons per year of a criteria pollutant. If a source triggers PSD requirements for one pollutant category, other pollutants emitted in significant amounts may also be subject to PSD, even if they are emitted in quantities below PSD trigger levels. These significant volumes are presented in Table 6.1-1. The PSD regulations also set ambient air quality impact "increments" that limit the allowable increase of ambient concentrations of criteria pollutants over a determined baseline concentration. The most stringent increments apply to "Class I" PSD areas, which include wilderness areas and national parks. The remaining areas in Washington state are designated as Class II areas. PSD regulations required those facilities which trigger PSD review to provide a detailed analysis of source emissions impacts on Class I areas. The intent of the PSD increments is to prevent air quality areas with concentrations below the ambient air quality standards from reaching the standards, i.e., keep pristine and clean areas clean. The Class I areas nearest to Kittitas are the Alpine Lakes Wilderness (approximately 35 miles northwest) and Mt. Rainier National Park (approximately 45 miles southwest). The general vicinity of the Kittitas site is designated "Class II," where less stringent PSD increments apply.

PSD will not be applicable to this proposal for the following reason: potential emissions at the Kittitas Terminal are limited to emission rates below the trigger threshold of 100 tons per year. PSD applicability is determined for each pollutant-emitting facility. According to 40 CFR 52.21 a facility is defined as a source which is within the same industrial grouping (SIC code), is located on one or more contiguous or adjacent properties, and is under common control.

For this proposal, the breakout facility of the pipeline (the Kittitas Terminal) is determined to be one separate facility from the pipeline and pump stations. The pump stations are classified as Pipelines/Refined Petroleum Pipelines, with an SIC code of 4613. The terminal is classified as a Petroleum

Bulk Station and Terminal with an SIC code of 5171. For this reason, the Kittitas Terminal in conjunction with the pipeline and pump stations do not meet the criteria for one facility. Additionally, the existing Pasco Northwest Terminalling facility is not under the same control as the pipeline or the Kittitas Terminal. Consequently, the pipeline is considered one facility, the Kittitas Terminal considered a second facility, and the Pasco facility is excluded from the two previous facilities. In addition, predicted potential emissions described in this section are less than the threshold which triggers PSD for either of the facilities. Therefore, PSD does not apply.

**6.1.2.3 Notice of Construction and Application for Approval**

The Energy Facility Site Evaluation Council (EFSEC) is the lead state agency responsible for environmental permitting of this project. EFSEC has adopted most air quality regulations promulgated by Ecology and may authorize operating permit conditions but must direct information to Ecology's permit register (WAC 463-39-100). WAC 173-400-091 states an authority with jurisdiction over a source, such as EFSEC, can issue a regulatory order the limits the source's potential to emit any air contaminant to a level agreed to by the owner and Ecology, and that this order shall be federally enforceable upon approval into the state implementation plan. EFSEC also may delegate to Ecology responsibility for administration of the NOC program. Also, sources under EFSEC jurisdiction must submit permit applications using standards forms developed by Ecology which must contain information pursuant to Ecology's Operating permit regulations. Ecology has jurisdiction over air quality issues in Kittitas, Grant, Franklin , and Adams Counties, as those counties do not have a regional air quality authority. For these reasons, this section is written in accordance in conjunction with Ecology's permitting requirements.

State law requires new air contaminant sources in Washington to file an NOC and undergo new source review (WAC 173-400-110). The Notice of Construction application provides a description of the facility and an inventory of pollutant emissions and controls. Requirements for new sources in unclassified areas, such as for the Kittitas Terminal, are provided in WAC 173-400-113 as follows:

- The source must demonstrate compliance with New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAPs), and applicable source or emission standards.
- The facility must employ Best Achievable Control Technology (BACT).
- Allowable emissions must not cause or contribute to a violation of the ambient air quality standards.
- If applicable, the source must meet PSD requirements.
- The source must comply with toxic requirements.
- If applicable, the source must comply with visibility protection review requirements.

Before an NOC is deemed complete and approved, the reviewing agency considers whether BACT has been employed and evaluates ambient concentrations resulting from these emissions to ensure compliance with ambient air quality standards. After the facility is constructed, it is inspected to ensure its compliance with the plans and specifications submitted with the NOC. This may include tests to determine the actual emissions from the facility.

OPL has determined that potential emission considering maximum operational and design capacities must be limited in order to demonstrate compliance with the benzene ASIL. The voluntary limitations for which OPL seeks, and are the basis for this analysis, are as follows:

- Storage tank fuel throughput- 36,639,000 barrels per year;
- Loading rack daily maximum throughput - 1,020,000 gallons per day; and
- Vapor recovery system with 99.9% removal efficiency.

With these limitations in place, the Kittitas Terminal will not emit greater than 17 tons per year of VOCs, and less than 10 tons per year of any one hazardous air pollutant (HAPs) or 25 tons combined HAPs. For this reason the Kittitas facility should be considered a synthetic minor source.

Monitoring and recordkeeping requirements for this facility will be utilized to demonstrate compliance with a minor source permit. The following methods will be used for compliance demonstration:

(1) Metering devices at the pipeline will be used to record fuel volume throughput in to the storage terminal. The maximum fuel volumes within any consecutive 12 month period will be limited to 36,639,000 barrels per year. Each fuel type (gasoline, diesel, jet turbine fuel) will be recorded and quantities used to calculate VOC emissions.

(2) VOC and benzene emissions will be calculated monthly and recorded from storage tank losses and losses due to fugitive emissions (equipment leaks).

(3) Loading rack VOC and benzene emissions will be controlled by limiting annual throughput of fuel dispensed to 1,020,000 gallons per day. On a daily basis, fuel type and quantities loaded will be recorded.

(4) Emissions from the loading rack equipment will be calculated, including emissions from the VRS and fugitive emissions from the associated loading rack equipment, and recorded monthly.

The methods presented throughout this application will be used to calculate monthly emissions from the corresponding equipment at the terminal. A 12-month running total will be recorded and monitored to ensure that the permit limits will not be exceeded: VOC emissions 17 tpy, benzene emissions 390 pounds per year.

### 6.1.2.4 New Source Performance Standards (NSPS)

**Storage Tanks**

EPA regulates storage tank facilities under 40 CFR Part 60, Subpart Kb, entitled "Standards of Performance for Volatile Organic Liquid Storage Vessels Constructed After July 23, 1984". This standard has been adopted by Ecology in WAC 173-400-115. This regulation is applicable to storage tanks with capacities equal to or greater than 40 cubic meters, such as those proposed for this project. However, storage tanks with capacity greater than 151 cubic meters and liquid contents held at a maximum total vapor pressure less than 3.5 kilopascals (Kpa) are exempt from most of the requirements of this regulation. This exemption applies to the diesel and jet fuel tanks maximum true vapor pressures are <1 Kpa, to which only recordkeeping and monitoring requirements apply. The tanks to which the full regulation applies are the gasoline (43 Kpa) and ethanol (6 Kpa) tanks because the maximum true vapor pressure of the contents is greater than 3.5 Kpa. This regulation also governs the type of storage tank to be constructed (fixed roof with internal floating roof); the types of seals to be used on the floating roof (mechanical shoe seals, vapor/liquid mounted seals); and the testing, recordkeeping, and reporting requirements associated with each type of tank and seal. Testing includes visual inspections of the tank, gaskets, seals, and other components. Record keeping and monitoring requirements include dimensions of the tank, the contents, the period the liquid is stored, and the true vapor pressure of the liquid stored in the tank. The facility will comply with this regulation by installing the following design and equipment for all tanks at the facility:

- Fixed external cone roof with welded internal floating roof;
- Primary and secondary vapor-mounted rim seals;
- Adjustable legs to support the internal floating roof during maintenance and repair periods; and
- Gasketed apertures.

Recordkeeping and monitoring requirement will be conducted as specified in 40 CFR 60 Subpart Kb for each storage tank.

**Loading Rack**

The delivery of gasoline through loading racks to tank trucks is regulated under 40 CFR Part 60, Subpart XX). This standard is applicable to all bulk gas terminals whose daily throughput is greater than 75,700 liters (20,000 gallons) per day. Requirements under this regulation pertain to emissions of VOCs from the vapor collection system, the proper loading of fuel into vapor-tight tank trucks, inspection and leak detection, and documentation. According to this NSPS, the vapor collection system shall not allow emissions to exceed 35 milligrams per liter of gas loaded. Tank trucks must be tested and documented regarding the vapor-tightness of each tank and records must be kept on file at the bulk facility. The daily throughput at the Kittitas Terminal is estimated to be greater than 20,000 gallons per day, and therefore the facility must meet these requirements. The loading rack at the Kittitas Terminal will comply with regulation by installing the required control equipment, ensuring that all tanker trucks are tested for vapor-tightness, and requiring operational conditions and methods to minimize fuel leakage during loading. The following is a review of control methods to be used at the loading rack:

- Dispensing fuel from the storage tank into tanker trucks using bottom-filled, submerged loading with dry coupling attachments at the product-loading arms. This method is considered to be the most effective means to reduce VOC losses during loading.

- Product cannot be loaded until all safety and vapor recovery equipment are properly affixed to the truck.

- The vapor recovery system with a 99.9% removal efficiency.

- Tank trucks are to be leak-checked and verified to be vapor-tight.

Recordkeeping and monitoring requirements will be implemented as stated in the NSPS.

#### 6.1.2.5 Emission Standards and Controls for Sources Emitting Gasoline Vapors

Ecology regulates sources which emit gasoline vapors in WAC 173-491. This regulation sets forth emission and control strategies which facilities must incorporate if they emit gasoline vapors. The control strategies which apply to the Kittitas Terminal concern the loading rack, tanker truck requirements, and the vapor recovery system. These requirements expand upon those stated in the NSPS and supersede WAC 173-490, Emission Standards and Controls for Sources Emitting VOCs.

The Kittitas Terminal, a gasoline loading facility, will comply with this regulation by meeting NSPS requirements for fixed roof tanks (WAC 173-491-040(1)), as discussed in the previous subsection. The loading rack operation and design parameters also comply with this regulation with the installation of a 99.9% VRS, and meeting gasoline transfer operations, as discussed in the previous subsection. The required monitoring and recordkeeping, as stated in 173-491-040(6)(c), will be implemented at the facility.

#### 6.1.2.6 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

NESHAPs are developed by EPA to limit and control emissions of hazardous and toxic air pollutants which are emitted by sources or source groups. Applicability of sources to NESHAPs is determined by each individual NESHAP. The NESHAPs which are applicable to the Kittitas Terminal are those regulating fugitive equipment leaks. Other NESHAPs would potentially regulate the terminal but are excluded from applicability for reasons provided.

**NESHAPs Governing Equipment Leaks**

NESHAPs for equipment leaks are cited in 40 CFR 63 Subpart J (benzene fugitive emissions) and Subpart V both promulgated in the early 1980's. The benzene NESHAP requires those sources in benzene service to comply with subpart J. Subpart J requires facilities to perform visual inspections monthly of pump seals. If a visual leak is observed, monitoring with instrumentation is required. If a leak (>10,000 ppm above background) is detected then repair must be initiated within 5 calendar days and completed within 15 calendar days. This is referred to as a leak detection and repair (LDAR) program. Valves must be instrument monitored monthly, and then quarterly if 2 consecutive months show no leakage. If a leak is found, then monitoring is again required monthly, and repairs must be made within 15 calendar days. At flanges and connectors, if a potential leak is found either visibly, audibly or olfactory, then instrument monitoring must confirm the presence of a leak within 5 days. A confirmed leak must be repaired within 15 calendar days. Recordkeeping and reporting are integral part of this regulation. The Kittitas Terminal has an inspection and maintenance program which meets the requirements of this regulation. Visual inspection is performed at the terminal, and instrument monitoring will be implemented if a leak is found. Valves will be monitored accordingly.

**Gasoline Distribution MACT**

The gasoline distribution Maximum Achievable Control Technology is a categorical source NESHAP promulgated by EPA in 1994. The gas MACT (40 CFR 63 Subpart R) applies to those facilities which are determined to be major sources emitting greater than 100 tons per year of VOCs. This determination can be made using two methods: an emission inventory can be developed demonstrating that the source does not emit VOCs greater than 100 tons per year; or by using the provided equation to determine an emission ratio. If the ratio is less than 0.5 then the gas MACT is not applicable. The source must notify EPA that emissions are less than applicable thresholds. If the ratio is greater than 0.5 but less than 1.0, then recordkeeping and reporting is required. If emissions are greater than 1.0 then the control technologies as well as recordkeeping and reporting are required. The Kittitas Terminal will not be a major source, as determined by the detailed emission inventory provided in this application, applying enforceable limitations on potential emission as requested. Because these limits are federally enforceable the Kittitas Terminal potentially emits less than 50 tons per year of VOCs. The facility will comply with the gas MACT by notifying EPA accordingly.

### 6.1.2.7 Toxic Air Pollutant Regulations

Ecology regulates emissions of known carcinogenic and toxic air pollutants (TAPs) from new and modified air pollution sources (WAC 173-460). This regulation establishes acceptable outdoor exposure levels (called Acceptable Source Impact Levels, or ASILs) for more than 500 substances. The ASILs were set conservatively to protect human health. For each "known, probable and potential" human carcinogenic pollutant (the Class A toxic air pollutants), the ASIL limits the risk of an additional cancer case to one in a million. For others (Class B toxic air pollutants), the ASIL was set by dividing those Class B toxics which have an inhalation reference factor by 300; this is intended to protect public health in communities with multiple sources of toxic air pollutants. Most of the Class A toxic air pollutant ASILs are based on an annual average concentration. A few of the Class A pollutants and all of the Class B pollutants are based on a 24-hour average concentrations. Additionally, all new sources of toxic emissions must apply T-BACT.

A facility can demonstrate compliance with WAC 173-460 by meeting established Small Quantity Emission Rates (SQERs) or by dispersion modeling. If a source which emits toxic air pollutants does not meet designated SQERs, a dispersion analysis should be performed, comparing modeled ambient concentrations and the ASILs. If modeled concentrations are less than the ASILs, a permit can be granted. If not, the applicant must revise the project or submit a health risk assessment demonstrating that toxic emissions from the source are sufficiently low to protect human health. For carcinogenic pollutants, the risk of an additional cancer case cannot exceed one in 100,000. The Kittitas Terminal will comply with WAC 173-460 using dispersion modeling to demonstrate that ASILs have been met. A discussion of BACT is also provided.

### 6.1.3 EXISTING AMBIENT AIR QUALITY CONDITIONS

For this application, the sources expected to create emissions of air pollutants are the Kittitas Terminal and, to a lesser extent, the pump stations proposed along the pipeline. The Kittitas Terminal is located in unclassified areas for all established criteria pollutants. Portions of the pipeline lie within King and Snohomish counties with recently reclassified attainment areas for ozone, carbon monoxide and PM10. Thrasher, North Bend Pump and Stampede Stations are located within this area under the jurisdiction of PSAPCA. All other areas of the pipeline, and the Kittitas Terminal are within Ecology's jurisdiction.

Ecology maintains a network of state and local ambient air monitoring stations throughout the state of Washington. These stations are located mainly in urban areas where pollutant concentrations are expected to be higher, either adjacent to major sources of pollutants or potential problem areas. There are currently no monitoring stations for criteria pollutants in the Kittitas area, and thus ambient concentrations for criteria pollutants are unavailable. However, representative existing data can be determined if the need arises.

In an attempt to characterize existing ozone and particulate concentrations along the pipeline route, a brief summary of monitored data is included in Tables 6.1-2 and 6.1-3. Table 6.1-2 presents existing concentrations in the Puget Sound area (King and Snohomish counties) and Yakima County. No other ozone monitoring stations exist within the vicinity of the pipeline that are reported by Ecology.

Table 6.1-3 presents particulate data along the pipeline route. Data concerning total suspended particulates are very scarce throughout the state. Puget Sound has recently been reclassified as an attainment area while the Yakima and Wallula areas exceed the ambient standards for PM10. In the Yakima and Tri-cities areas, memorandum of agreements have been issued which state that the areas are out of compliance with the standards, yet have not been designated as nonattainment areas. Along the Columbia Plateau, numerous studies have been initiated to gain a better understanding of wind blown dust and the causes of high concentrations in Eastern Washington.

**TABLE 6.1-2**
**MONITORED OZONE CONCENTRATIONS**

| Location | Ozone Concentration (ppm) | |
|---|---|---|
| Puget Sound | 1993 | 1994 |
| Getchell (Snohomish County) | .093 | .082 |
| Lake Sammamish | .098 | .107 |
| Klickitat County- Wishram, WA | .071 | .092 |

**TABLE 6.1-3**
**MONITORED PARTICULATE CONCENTRATIONS**

| | Particulate Concentration (ug/m3) | | | |
|---|---|---|---|---|
| | Annual | | 24-hour | |
| Location | 1993 | 1994 | 1993 | 1994 |
| Puget Sound: | | | | |
| TSP Bellevue-NWRO | -- | 20 | -- | 38 |
| TSP Seattle- Harbor Island | -- | 43 | -- | 129 |
| PM10 Bellevue | 20 | 18 | 47 | 45 |
| PM10 Seattle, Harbor Island | 23 | 27 | 90 | 60 |
| Kittitas Area- none | | | | |
| Yakima County- PM10 | | | | |
| Yakima-Garfield | 38 | 31 | 97 | 89 |
| Yakima-YVCC | 31 | 27 | 93 | 104 |
| Othello | 36 | 26 | 224 | 62 |
| Wenatchee | 25 | 31 | 62 | 361 |
| Kennewick-Columbia Center | 32 | 25 | 1166 | 125 |
| Wallula | 38 | 37 | 195 | 173 |
| | | | | |
| TSP standard | -- | 60 | -- | 150 |
| PM10 standard | -- | 50 | -- | 150 |

### 6.1.4 CLIMATE AND METEOROLOGY

Section 3.2 of the EFSEC application describes climate and meteorology in designated areas of the proposed pipeline route. The Kittitas Terminal is located within the designated area referred to as the Columbia Basin Flat. This area has an arid to semiarid climate with little precipitation, warm, sunny summer days, and relatively cold winters. The average annual temperature for the region, based on climatological data for Yakima, Washington, equals 9.9EC (Franklin and Dyrness, 1973). Average January and July temperatures equal -2.5EC and 21.7EC, respectively. In this region, the Cascade Mountains create an orographic barrier against the maritime climates to the west of the Cascades, and the Columbia River Basin is generally very dry as a result of air masses being diverted downward, compressed, and warmed-- thus inhibiting precipitation. Precipitation for the entire state is depicted in Figure 3.2-1.

NCDC does not publish meteorological data for the Kittitas or Ellensburg area. Neither is surface meteorological data recorded anywhere in the area at the present time. However, representative meteorological data used for dispersion modeling was purchased from NCDC. Hourly meteorological surface data was collected at station # 24220, Bowers Field, in Ellensburg, Washington up to the year 1954. Five years of surface data were purchased for the years 1950 through 1954. This data was compiled with upper air data collected in Spokane for the corresponding time period to calculate a five-year annual average suitable for modeling. NCDC compiled this data into a 16 directional joint frequency format using EPA's approved STAR program. This data was used for dispersion modeling using ISCLT3. Table 6.1-4 presents a summary of the STAR data for the Ellensburg area.

**TABLE 6.1-4**
**WIND FREQUENCY DISTRIBUTION FOR ELLENSBURG, WASHINGTON**

| Direction | Speed (Knots) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0-3 | 4-6 | 7-10 | 11-16 | 17-21 | >21 | % | Avg Spd. |
| N | .015406 | .007855 | .003516 | .000525 | .000023 | .000000 | 2.732500 | 5.1 |
| NNE | .008204 | .005959 | .003265 | .001164 | .000068 | .000046 | 1.870600 | 6.1 |
| NE | .036624 | .022102 | .010458 | .001301 | .000091 | .000023 | 7.059900 | 5.3 |
| ENE | .024562 | .017353 | .010343 | .001370 | .000297 | .000160 | 5.408500 | 5.9 |
| E | .048862 | .031053 | .016120 | .003539 | .000365 | .000068 | 10.000700 | 5.6 |
| ESE | .018823 | .011576 | .007603 | .002283 | .000046 | .000023 | 4.035400 | 6.0 |
| SE | .028895 | .015093 | .006987 | .001758 | .000068 | .000000 | 5.280100 | 5.2 |
| SSE | .018019 | .010001 | .004795 | .001438 | .000046 | .000000 | 3.429900 | 5.5 |
| S | .023574 | .011394 | .004658 | .001347 | .000365 | .000091 | 4.142900 | 5.3 |
| SSW | .009087 | .005115 | .001735 | .000320 | .000114 | .000000 | 1.637100 | 5.1 |

**TABLE 6.1-4 (CONTINUED)**
**WIND FREQUENCY DISTRIBUTION FOR ELLENSBURG, WASHINGTON**

| Direction | Speed (Knots) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **0-3** | **4-6** | **7-10** | **11-16** | **17-21** | **>21** | **%** | **Avg Spd.** |
| SW | .015572 | .006690 | .002078 | .000502 | .000023 | .000000 | 2.486500 | 4.7 |
| WSW | .007336 | .004064 | .001667 | .000342 | .000023 | .000023 | 1.345500 | 5.2 |
| W | .017740 | .009704 | .006142 | .002238 | .000320 | .000525 | 3.666900 | 6.5 |
| WNW | .018105 | .011987 | .019591 | .036739 | .032400 | .060142 | 17.896400 | 17.8 |
| NW | .023196 | .013883 | .023632 | .067107 | .057060 | .064823 | 24.970100 | 16.8 |
| NNW | .012897 | .007101 | .005982 | .008357 | .004224 | .001781 | 4.034200 | 10.5 |
| Average Annual Speed | | | | | | | | 6.9 |

As shown in the table, prevailing wind directions are from the west-northwest and northwest directions approximately 43% of the time. Annual average speed for the Kittitas-Ellensburg area equals 7 knots (8 mph). The complete 5-year STAR data file is included in Appendix D.

The dispersion modeling used in this analysis and for ozone and odor impacts also requires the use of mixing height data. A summary of representative mixing height data for the Kittitas area is presented in Table 6.1-5. These data were derived from EPA isopleths developed by Holzworth (USEPA, 1972).

**TABLE 6.1-5**
**MIXING HEIGHTS AND WIND SPEEDS FOR KITTITAS, WASHINGTON AREA**

| | Winter | | Spring | | Summer | | Autumn | | Annual | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Kittitas Area** | **Mixing Height (m)** | **Wind Speed (m/s)** | **Mixing Height (m)** | **Wind Speed (m/s)** | **Mixing Height (m)** | **Wind Speed (m/s)** | **Mixing Height (m)** | **Wind Speed (m/s)** | **Mixing Height (m)** | **Wind Speed (m/s)** |
| Morning | 400 | 5 | 600 | 5 | 400 | 4 | 400 | 4 | 500 | 5 |
| Afternoon | 400 | 5 | 1800 | 6 | 2000 | 5 | 1200 | 5 | 1300 | 5 |

Mixing height parameters used as input into the model were developed from the above table based on recommendations specified in the ISCLT3 user's guide.

Temperatures used in the ISCLT3 model were based on the recommendations provided in the user's guide. The annual average daily maximum and minimum temperatures as recorded from the 1994 Local Climatological Data - Annual Summary for Yakima, Washington was used for the model input parameters. The normal temperatures are as follows:

- Average Daily Maximum:  62.8°F
- Average Daily Minimum:  36.96°F
- Annual Average:  49.8°F

## 6.1.5  ESTIMATED POLLUTANT EMISSIONS

The following subsection presents emission estimates of criteria pollutants associated with the project's Kittitas Terminal and the pump stations. Construction emissions and operational emissions are also estimated for each source type.  Due to the nature of the operations at each of the source types (storage and loading of fuels), total VOCs are the primary pollutant of concern; however, toxic emissions are also estimated and compared to Ecology's ASILs.  Pumping and metering equipment at the pump stations and the Kittitas Terminal are operated by electricity, therefore other pollutant emissions would be insignificant.  However, the Kittitas Terminal will include a diesel-operated firewater pump.  This pump will be used for emergency only but must be periodically tested to insure operation.  A discussion of construction emissions along the pipeline route is also included in this subsection.

### 6.1.5.1  Kittitas Terminal

**Construction Emissions**

There is currently no specific information available to estimate construction emissions of the Kittitas storage and distribution facility; however, fugitive dust calculations can be estimated based on the number of acres of land for the site.  The equation below, provided by EPA (USEPA, 1995) predicts fugitive dust emission during heavy construction:

$$E = 1.2 \text{ tons/acre/month}$$

Assuming the entire site (22 acres) is disturbed for one full month of construction, fugitive dust emissions are estimated at 26.4 tons of particulate matter smaller than 10 microns.  Assuming that construction and ground disturbance did not extend past the estimated month, the annual emissions would be the same.  Emissions from construction would be reduced by water suppression methods, which can yield a 50 percent decrease in fugitive emissions, thus reducing the emissions to 13.2 tons per month.

**Operational Emissions**

<u>Firewater Pump Emissions</u>

The firewater pump will be operated one half hour per week as mandated by fire safety codes. This pump utilizes a diesel operated internal combustion engine rated at 200 horsepower. Emission factors from AP-42 Supplement B with a D-rating were used to calculate potential emissions form this source. The emission factors and corresponding emissions are presented in Table 6.1-6. Because the firewater pump is operational only 26 hours per year, and emissions are less than 1 ton per year for all criteria pollutants, this source is considered an insignificant source and is not included in the operational emissions inventory of the Kittitas Terminal. The remaining discussion focuses on the storage and loading operations at the terminal.

**TABLE 6.1-6**
**POLLUTANT EMISSIONS RESULTING FROM THE FIRE PUMP IC ENGINE AT THE KITTITAS FACILITY**

| Pollutant | Emission Factora (lb/hp-hr) | Hourly Emission Rateb (lb/hr) | Annual Emission Rate c (lb/yr) | Annual Emissions (tons/yr) |
|---|---|---|---|---|
| NOx | 0.031 | 3.1 | 161.20 | 0.08 |
| TOC -Exhaust | 2.47E-03 | 0.247 | 12.84 | 0.01 |
| TOC-Crancase | 4.41E-05 | 0.00441 | 0.23 | 0.00 |
| TOC Total | ** | 0.25141 | 13.07 | 0.01 |
| CO | 6.68E-03 | 0.668 | 34.74 | 0.02 |
| PM10 | 2.20E-03 | 0.22 | 11.44 | 0.01 |
| SOx | 2.50E-03 | 0.25 | 13.00 | 0.01 |
| Benzene | 9.33E-04 | 0.0933 | 4.85 | 0.00 |

a Emission factors are presented in AP-42, Supplement B, Section 3.3 for diesel-powered IC engines.
b Hourly emission rates are based on the hourly usage for the emergency fire pump operation: 0.5 hr per week. (200 horse-power)
c Annual emission rates are based on 0.5 hr per week for 52 weeks. (26 hours per year)

Maximum Potential to Emit

Sources of operational emissions from the Kittitas Terminal are: (1) bulk storage tanks; (2) dispensing of fuel from the storage tank to tanker trucks (truck loading losses); and (3) fugitive emissions from pipeline valves, flanges, and pump seals throughout the facility.

The maximum potential to emit pollutants at the Kittitas Terminal is based on throughput volumes. The first consideration is the maximum design capacity of the pipeline to deliver product to the storage facility. The second consideration deals with the maximum throughput of product loaded at the transfer rack.

**Storage Tanks:** The design capacity of the pipeline was determined by OPL as the maximum pumping and transporting capacity of fuels along the pipeline route. The design considered the ability of the pipeline to carry liquids within a 14" pipe through metering and pumping equipment into the storage facility. This capacity equals 7200 barrels per hour, or 172,800 barrels per day for 365 days per year. The pipeline is also designed to bypass the storage equipment completely.

The storage design of the terminal was based on the types of products in demand and the quantity of this demand. The demand for product type was based on historical records and professional experience for fuel product demand. The percentage of fuel type to be transported and stored is therefore assumed to be the following:

subgrade gasoline 20.1%
regular gasoline 20.1%
premium gasoline 19.8%
low sulfur diesel 18%
high sulfur diesel 22%.

Jet turbine fuel may be delivered to storage via the pipeline. At the present time there is no demand for jet fuel explaining is exclusion from the above list. If jet fuel is eventually transported in the pipeline to storage, as expected, the jet fuel throughput will displace and offset diesel or gasoline throughput, both which emit greater amounts of VOCs.

An additional consideration in storage capacity design is the use of storage tanks themselves. It is anticipated that each tank will operate o a 6-day turnover cycle. This scenario allows for a maximum of 60 turnovers per year for each tank.

If the storage facility accepted the maximum throughput rate of the pipeline, tanks would require more than 60 turnovers annually, which is not feasible for the use of the tanks. Therefore, the capacity of the storage facility is limited to a determined throughput volume into the storage facility. This value is easily recorded due to the metering equipment at the facility.

If the storage facility receives 108,600 barrels per day, assuming the demand for product is as stated, gasoline and diesel tanks would turnover nearly 60 turnovers annually. This is depicted in Table 6.1-7. OPL will accept permit restriction concerning the throughput of fuel into the storage facility as 36,639,000 barrels per year. A yearly restriction is suggested as VOC emissions determine benzene concentrations which is regulated on an annual basis.

**TABLE 6.1-7**

## MAXIMUM PROJECTED OPERATING SCENARIOS - CROSSCASCADES PIPELINE- SPRING 1997

**Based on projected 30-year growth factor (2% per year for 30 years)**

Pipeline capacity = 60,000 barrels/day for 365 days/year; 60000 bl/day * 365 days/yr * 1.81 = 39,639,000 barrels/year; 108,600 barrels/day; 1,664,838,000 gal/yr; 4,561,200 gal/day

Storage Tank Capacities: Based on 30 -yr demand plan

| Tank # | Liquid Stored | Volume (1000 bls) | Volume (gal)1 | % tl 2 | Annual Net Throughput (gal/yr)3 | Annual Turnover Rate | Monthly Throughput - Summer 5 | Monthly Throughput - Winter | Shell Height ft | Shell Diameter ft |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | transmix | 10 | 420,000 | na | 3,346,324 | 7.97 | 301,169 | 256,552 | 40 | 50 |
| 2 | ethanol | 10 | 420,000 | na | 420,000 | 1 | 35,000 | 35,000 | 40 | 50 |
| 3 | premium gas | 125 | 5,250,000 | 19.8 | 329,637,924 | 62.79 | 29,667,413 | 25,272,241 | 48 | 150 |
| 4 | regular/sub gas | 90 | 3,780,000 | 13.4 | 223,088,292 | 59.02 | 20,077,946 | 17,103,436 | 48 | 128 |
| 5 | regular/sub gas | 90 | 3,780,000 | 13.4 | 223,088,292 | 59.02 | 20,077,946 | 17,103,436 | 48 | 128 |
| 6 | regular/sub gas | 90 | 3,780,000 | 13.4 | 223,088,292 | 59.02 | 20,077,946 | 17,103,436 | 48 | 128 |
| 7 | high sulfur diesel | 90 | 3,780,000 | 11 | 183,132,180 | 48.45 | 15,261,015 | 15,261,015 | 48 | 128 |
| 8 | high sulfur diesel | 80 | 3,360,000 | 11 | 183,132,180 | 54.50 | 15,261,015 | 15,261,015 | 48 | 120 |
| 9 | low sulfur diesel | 115 | 4,830,000 | 18 | 295,890,840 | 61.26 | 24,657,570 | 24,657,570 | 48 | 145 |
| 10 | jet turbine fuel4 | 90 | 3,780,000 | na | 3,780,000 | 1 | 315,000 | 315,000 | 48 | 128 |
| Sum | | 770 | 32,340,000 | 100 | 1,664,838,000 | | | | | |

1 - One barrel = 42 gallons
2 - Demand plan of 40.2% subgrade/ reg; 19.8% premium;18% low sulfur; 22% hi sulfur; % transmix = 1/2 of 1% of the volume of sub/reg; ethanol 1 tank capacity.
3 - Throughput = total pipeline gallons * % tl; ethanol is loaded from the auxiliary loading rack; transmix is either sent via pipeline or unloaded into tankers at the auxilliary rack.
4 - Jet A fuel may be delivered to storage via the pipeline. If delivered the volume stored will displace volume from either gas or deisel, both which emit higher VOCs. For air permitting purposes, the jet turbine tank will assume 1 turnover, to account for VOCs from the tank, and annual throughput will be subtracted from lost diesel fuel throughput.
5 - Seasonal variability of gasoline is based on 1995 monthly sales data from OPL Summer (April -Sept)=54%, winter = 46% of total sales. Applies to gasoline only.

Transfer Rack*

2 - 10,000gal trucks every 20 mins for 17 hours/day 365 days/yr = 372,300,000 gal/yr; 1,020,000 gal/day; 102 trucks/day
* Auxilliary rack is negligible based on content and use

Further analysis of the storage tank design suggests additional limitations. VOC content of each product at the facility ranges from very small amounts (diesel and jet fuel) to large amounts emitted by gasoline products. Gasoline products are segregated by grade, and differ by seasonal blend. (Summer and winter blend volatility is restricted by federal regulation 40 CFR 80 - Regulations of Fuel and Fuel Additives.) In Washington, blends, differentiated by Reid Vapor Pressure, cannot exceed 9.0 RVP in the summer (10 if ethanol blends are used). The regulated period is May 1 through September 15. The state can also regulate RVP but cannot be less stringent than federal regulations. OPL is regulated not only by statute but also by tariff agreement. The maximum RVP values according to tariff agreement are presented in Table 6.1-8 for each month. The emission inventory is calculated using fuels with RVP10 and RVP13, representing summer and winter blends respectively.

**TABLE 6.1-8**
**RVP PROFILE- OPL**

Profile is based on tariff agreement with Texaco

Regulated season is Mar 1 thru Sept 15.

| Month | Tarriff RVP Value | RVP Applied in Modeling |
|---|---|---|
| January | 15.0 | 13 |
| February | 15.0 | 13 |
| March | 13.5 | 13 |
| April | 11.5 | 13 |
| May | 9.0 | 10 |
| June | 9.0 | 10 |
| July | 9.0 | 10 |
| August | 9.0 | 10 |
| September | 11.5 | 13 |
| October | 13.5 | 13 |
| November | 13.5 | 13 |
| December | 15.0 | 13 |

Because summer and winter blend volatilities differ, and because each corresponding blend has different benzene content, demand for gasoline products were further investigated. According to historical data and professional experience, demand for gasoline is greater in the summer months (April to September) than during winter months (October through March). This is consistent with analyses presented in the gas MACT background document which states that summer gasoline sales equate to greater than 60% of annual sales. OPL has provided regional sales data for 1995 by month for gasoline and diesel fuel. These values are presented in Table 6.1-9 and depicted graphically in Figure 6.1-7.

FIGURE 6.1-7 - SEASONAL GASOLINE AND FUEL DEMAND

**TABLE 6.1-9**
**FUEL SEASONAL USAGE PROFILE - WASHINGTON**

| Month | Gas (bl) | Average | Relative to avg | % of Tl | Fuel (bl) | Average | Relative to avg | % of Tl |
|---|---|---|---|---|---|---|---|---|
| Jan | 5,498,459 | 5,715,330 | 0.96 | 8% | 3,905,342 | 3,658,467 | 1.07 | 9% |
| Feb | 4,872,183 | 5,715,330 | 0.85 | 7% | 3,576,085 | 3,658,467 | 0.98 | 8% |
| Mar | 5,569,462 | 5,715,330 | 0.97 | 8% | 3,941,506 | 3,658,467 | 1.08 | 9% |
| April | 5,993,643 | 5,715,330 | 1.05 | 9% | 3,573,966 | 3,658,467 | 0.98 | 8% |
| May | 6,399,699 | 5,715,330 | 1.12 | 9% | 3,542,891 | 3,658,467 | 0.97 | 8% |
| June | 6,057,243 | 5,715,330 | 1.06 | 9% | 3,691,645 | 3,658,467 | 1.01 | 8% |
| July | 6,184,378 | 5,715,330 | 1.08 | 9% | 3,801,528 | 3,658,467 | 1.04 | 9% |
| Aug | 6,049,969 | 5,715,330 | 1.06 | 9% | 4,055,529 | 3,658,467 | 1.11 | 9% |
| Sept | 6,131,495 | 5,715,330 | 1.07 | 9% | 3,553,301 | 3,658,467 | 0.97 | 8% |
| Oct | 6,040,978 | 5,715,330 | 1.06 | 9% | 3,848,910 | 3,658,467 | 1.05 | 9% |
| Nov | 4,994,644 | 5,715,330 | 0.87 | 7% | 3,353,831 | 3,658,467 | 0.92 | 8% |
| Dec | 4,791,808 | 5,715,330 | 0.84 | 7% | 3,057,065 | 3,658,467 | 0.84 | 7% |
| Total | 68,583,961 | | | 100% | 43,901,599 | | | 100% |
| Average | 5,715,330 | | | | 3,658,467 | | | |

The annual average gasoline sales are less than the values for the summer months, and higher than those for winter months. For this analysis, October is not considered a summer month, even though monthly sales are above annual monthly values. Sales during summer months equal 54% of total sales while winter months equal 46% of total sales. Diesel fuel does not appear to vary by season.

Based on this information, monthly throughput for gasoline tanks are calculated by season-summer and winter, according to each blend type. Table 6.1-7 reflects this assumption for each tank by multiplying annual net throughput by seasonal variability. The seasonal monthly throughput equals the percentage of net throughput assumed for seasonal demand divided by the number of months in the seasons. For example, the summer monthly throughput equals the net throughput multiplied by .54, divided by 6.

The intent of this scenario is to account for emissions from both fuel blends at the terminal. OPL will monitor and record seasonal blend quantities and include the predicted emissions of VOCs and benzene by blend in the 12-month consecutive running total to demonstrate compliance with permit limits.

<u>Loading Rack</u>

The maximum potential of the transfer loading rack is also based on a limiting value. OPL will restrict daily throughput of fuel dispensed at the loading rack. The limitation is based on the premise that two main transfer bays are present at the facility. Two tanker trucks with a carrying capacity of 10,000 gallons can load product simultaneously taking 20 minutes per loading operation. The remaining loading bay is an auxiliary rack reserved solely for the use of unloading ethanol into the storage facility, and possibly loading of transmix into tanker trucks. The annual amount of transmix is relatively small, as most transmix is put back into the pipeline system for product recovery. However, if the transmix volumes are enough to where dilution into the system is not able to keep up with the receipt of transmix into storage, the transmix may be off-loaded into tanker trucks and transported to a refinery. For this reason, the auxiliary rack is not considered as part of the emission inventory as far as daily or annual throughput. However, fugitive emissions from the auxiliary rack are included in the fugitive emissions calculations. With this in mind, the maximum number of trucks to load product equals 6 trucks per hour. This operation is anticipated as a 24-hour operation with the majority of loading occurring during the early morning and daylight hours. However, the likelihood of the transfer rack operating at full capacity is very unlikely. Based on professional experience, OPL wishes to limit daily throughput to 1,020,000 gallons per day with an annual throughput of 373,300,000 gallons per year. This is equivalent to 102 10,000 gallon trucks loading product throughout a 24-hour period.

In order to differentiate demand for gasoline blends, the same premise was used as for the storage tanks: product demand for gasoline is greater in summer than in the winter, and gasoline blends differentiate between respective RVP values for each season.

A discussion concerning the type of control equipment associated with the pollutant sources follows. The determination of what constitutes BACT is essential prior to presenting a discussion on predicted facility emissions.

**BACT Determination**

Best Available Control Technology (BACT) Demonstration

As demonstrated in the discussion of project emissions, the proposed Kittitas terminal facility does not qualify as a major source of air pollutants under the federal Prevention of Significant Deterioration (PSD) regulations, and therefore does not trigger the associated federal Best Available Control Technology (BACT) requirements. However, pursuant to WAC 173-400-113, the applicant for a new source or modification in an attainment or unclassifiable area must demonstrate that:

> A..the proposed new source or modification will employ BACT for all pollutants not previously emitted or whose emissions would increase as a result of the new source or

modification.@

This Washington requirement (WAC 173-400-030) applies to any increase in emissions that the new source or modification would cause. Accordingly, this BACT analysis is included to demonstrate that the proposed facility will utilize emission controls that are consistent with Washington=s BACT requirements

Note that the State=s air quality regulations do not specifically require that a BACT determination be presented according to the Atop-down@ method that has been a component of USEPA policy for PSD projects since 1987. Nevertheless, the Department of Ecology has also adopted the top-down approach as a policy matter, and the present analysis has been conducted accordingly. This explains why federal guidance documents intended for PSD permitting applications are cited throughout the following discussion, even though the federal PSD program itself does not apply to the Kittitas project.

The top-down process for determining BACT provides that all available control technologies for a particular emission source be ranked in descending order of control effectiveness, with the most stringent or Atop@ alternative considered first and discarded only if it can be demonstrated that technical considerations, or energy, environmental or economic impacts justify a finding that this control option is infeasible. If the most stringent technology is eliminated based on one or more of these criteria, then the next most stringent alternative is considered, and so on, until a feasible technology is identified. The five basic steps for implementing the top-down process for a particular emission unit are listed below

(1) Identify all available control technologies.

(2) Eliminate technically infeasible alternatives.

(3) Rank remaining control technologies by control effectiveness.

(4) Evaluate remaining controls in terms of the energy, environmental and economic impacts, both benefic

(5) Select BACT as the most effective control option not eliminated due to the considerations in the previous

The only criteria pollutant that will be emitted by the Kittitas terminal in appreciable quantities is volatile organic compounds (VOCs). This pollutant is of regulatory concern primarily because of its role in the atmospheric formation of ozone. There are three categories of VOC sources at the proposed facility: storage tanks, truck rack and general fugitive emissions due to leaks from valves, flanges, pump seals, etc. The following subsections provide the BACT demonstrations for each category of sources. The only source of other pollutants will be an emergency firewater pump that will operate on diesel fuel. However, this piece of equipment will be tested only about one-half hour per week to ensure its operability, and the associated emissions of combustion pollutants ($NO_x$, $SO_2$, CO and $PM_{10}$) are not subject to BACT requirements.

Storage Tanks

**Baseline Emissions**: The effectiveness of the candidate control options, i.e., the fraction of pollutants removed for each type of control equipment, must be measured relative to some Abaseline@ emission level, which essentially represents the uncontrolled emissions from the source in question. According to EPA guidance, the application of New Source Performance Standards (NSPS), National Emission Standards for hazardous air pollutants (NESHAPS), and other controls necessary to comply with state or local air pollution regulations may not be assumed in the calculation of baseline emissions (EPA 1990). However, the same EPA document defines the baseline emissions for a given source as Athe *realistic* scenario of upper-bound, uncontrolled emissions from the source@ (emphasis added). Thus, the definition of baseline emissions should not ignore industry standard operating practices, safety standards or equipment that may reduce emissions, but which would be installed for valid reasons other than air quality control.

The least effective tank design for the purposes of VOC emission control, i.e., the first design considered as a candidate for the baseline emission scenario was fixed-roof tanks without internal floating roofs. However, as explained below, this design is not normally used by industry today for storage of gasoline for practical reasons, and was rejected as the baseline case accordingly.

Calculations made with the EPA TANKS emission program for an uncontrolled fixed cone roof gasoline tank with a capacity of 125,000 barrels, the largest tank proposed for the Kittitas facility, and the maximum facility throughput and product mix assumptions described in Table 6.1-7 shows that this design would result in the emissions of approximately 802 tons of VOC per year (see Table 6.1-10). The adverse economic impact of this level of product loss to the operator of a multiple-tank facility would be substantial, which is one of the most important reasons why the use of this tank design for storage of volatile products has declined over recent years. A rule of thumb used by the industry to calculate the cost of such losses is that every four pounds of VOC emissions corresponds roughly to the loss of one gallon of stored gasoline (API 1983). Based on the spot market wholesale price of $0.7125 per gallon for regular gasoline quoted in the September 23, 1996 issue of the Oil & Gas Journal, the value of the product losses from just one 125,000 barrel fixed-roof tank would be more than $285,000 per year, i.e., (802 tons VOC emissions) x (2000 lb./ton) x (1 gallon/4 lb. emissions) x ($0.7125/gallon). For the proposed facility with ten tanks, of which at least the four largest vessels will be in gasoline service at all times, the annual loss of product would amount to more than one million dollars.

**TABLE 6.1-10**
**DESIGN FEATURES ASSUMED AND RESULTS FOR TANKS PROGRAM CALCULATIONS OF VOC EMISSIONS FROM A 125,000 BARREL FIXED-ROOF AND EXTERNAL FLOATING ROOF TANK**

| Tank Type: Diameter = 140 feet Volume = 5,250,000 gallons | VOC Emissions |
|---|---|
| Fixed Roof<br><br>Breather vent settings @ -.03 psig<br>Vapor space volume = 370,399 cubic feet<br>RVP10 gasoline fuel content | 802 tons per year |
| External Floating Roof<br><br>Welded double-deck with adjustable roof legs<br>Vapor mounted primary seals, no secondary seals<br>Weather shield<br>RVP 10 gasoline fuel content | 18.4 tons per year |

Thus, for purely economic reasons, OPL would not construct uncontrolled fixed-roof tanks for gasoline storage at Kittitas. In addition to these cost considerations, there are other practical reasons that would prevent OPL from using the fixed-roof tank design for the Kittitas Terminal. Because of the high vapor pressure of gasoline, the buildup of hydrocarbon vapors in the confined headspace of such tanks can lead to fire and explosion, a risk that is unacceptable for a facility with multiple tanks closely spaced on a relatively small property near a population center.

The fixed-roof option does not satisfy EPA=s criterion that the baseline scenario used for a BACT analysis represent a Arealistic@ uncontrolled case, since there are compelling reasons other than emission control that would disqualify this design for the proposed facility. Based on this result, the next control system considered as a candidate baseline emission scenario for the storage tanks at Kittitas is the external floating roof design with a single vapor-mounted seal. This design corresponds almost exactly to the baseline definition used by EPA in developing the New Source Performance Standards for volatile organic liquids storage tanks (EPA 1984, 1987).

Emissions calculations obtained with the TANKS program for the external floating roof design indicate this option would reduce VOC emissions from a 125,000 barrel tank to about 18.4 tpy, i.e., a decrease of almost 98% relative to the fixed roof tank option, and would therefore greatly reduce the product loss problem associated with fixed roof tanks. Table 6.1-10 shows the assumptions used in TANKS for this calculation. Gaskets for tank hatches and sampling ports and other features assumed in the TANKS application are standard equipment that would be provided by any candidate tank vendor for product retention purposes. Also included in the input assumptions is a weather shield, i.e., an aluminum dome structure that will be installed to protect against product contamination by debris and water.

Cost data provided by a qualified tank vendor show that the capital cost for the external floating roof tank is comparable to that for an internal floating roof tank which would provide considerably more effective VOC emission control An installed-cost quote of $818,500 was obtained from CBI Services, Inc. of Bourbonnais, Illinois (CBI 1997) for a 90,000 barrel tank in gasoline service with external floating roof and primary seal, versus $783,000 for an internal floating roof design with primary vapor-mounted seal. Since the latter would reduce the emissions of a single 90,000 barrel tank to about 6.25 tons per year (versus 17.9 tpy for the external floater in similar service) and would represent a slightly smaller capital investment, there would be no valid business reason for OPL to use the external floating roof design. In addition, the cost quoted by CBI for a 90,000 bbl tank with an internal floating roof equipped with both primary and secondary vapor-mounted seals, is $796,900. Since the latter scenario, which would result in estimated VOC emissions of only 3 tons per year, is the only one of this group that meets the New Source Performance Standard (40 CFR 60 Subpart Kb) that is applicable to the four gasoline tanks and the transmix tank, there is no regulatory justification for considering any control scenario that is less stringent than this one.

Although consideration of NSPS requirements is not normally included in the baseline determination, the fact that the cost of meeting NSPS is so nearly comparable to that for any reasonable scenario with lesser controls means that there is no compelling business reason to propose a less effective control system for this analysis. Accordingly, the control system selected as the reference scenario for all storage tanks at the Kittitas facility is internal floating roof with vapor mounted primary and secondary seals. The remainder of this BACT discussion for storage tanks will address only this scenario and others with higher emission control efficiencies. As demonstrated above, other less-effective controls would not be selected for business reasons and would not, in any case be approvable, since they would not comply with a New Source Performance Standard that is definitely applicable to some of the tanks at this facility.

**Available Control Options**: Based on the previous section, emission control options considered for applicability to the ten storage tanks at the Kittitas facility included the following:

- internal floating roof with primary and secondary seals (vapor mounted)
- internal floating roof with primary and secondary seals (liquid mounted)
- internal floating roof with primary and secondary seals and vapor recovery system with flare for destruction of collected vapors
- internal floating roof with primary and secondary seals and vapor recovery system with refrigeration/condensation for destruction of collected vapors
- internal floating roof with primary and secondary seals and vapor recovery system with carbon adsorption system for destruction of collected vapors.

Review of the EPA's BACT/LAER Clearinghouse data base indicated that internal floating roof tanks have generally been used to meet PSD BACT requirements for gasoline storage facilities. No instance of a more stringent BACT determination for this type of facility was identified in the data base. Previous applications of vapor recovery with add-on vapor destruction devices that have been used to satisfy BACT requirements were invariably for fixed-roof tanks with much higher potential VOC emissions.

The VOC emissions that will occur for the Kittitas tank farm with each of these control scenarios and the corresponding percent emission reductions relative to the baseline scenario are listed below:

- internal floating roof with double seals (vapor mounted) -- this is the baseline or reference scenario, as determined above
- internal floating roof with double seals (liquid mounted) -- 29% below baseline
- internal floating roof with double seal and vapor recovery system with 99.9% efficient flare or carbon adsorption system or refrigeration system applied to emissions from five gasoline and transmix tanks -- 95.5% below baseline

Based on discussions with control equipment vendors, a 99.9% reduction of the VOCs recovered from the storage tank headspaces would be technically achievable with a thermal destruction system, carbon adsorption system or condensation/refrigeration system. However, since the four tanks that will be dedicated to gasoline storage plus the transmix tank are projected to account for about 95.5% of the total tank farm emissions, we have considered vapor recovery systems only for these five tanks. This explains why total emissions listed above for the add-on control scenarios are slightly higher than 1% of the full tank farm emissions before vapor recovery.

Elimination of Technically Infeasible Options

Internal floating roof tanks with either liquid-mounted and vapor-mounted double seals are considered feasible for the Kittitas facility from an engineering standpoint. However, as discussed below, the practicality of additional controls, including a vapor recovery system with a flare, refrigeration system, or carbon adsorption system would be highly questionable for this tank farm. Note that the following discussion of potential add-on controls assumes that these technologies would be applied in addition to internal floating roof tanks.

**Vapor recovery with flare:** This control technology was identified as a BACT precedent for volatile liquid storage tanks, although not necessarily for gasoline storage tanks and not in combination with floating roof tanks. There are several strong reasons against the use of flaring at the Kittitas facility. First, the Oil Company International Insurance recommendation that a flare should not be located closer than 100 feet from any tank for safety reasons would be difficult to achieve at this facility, because of the small size of the property (see Figure 6.1-1). In fact, most companies prefer a separation of 150-200 feet, which would definitely not be practical at this limited area site.

In addition to these safety considerations, the quantity of excess VOCs generated by the tank farm with floating roof tanks and double seals (10 to 14 tons) would be insufficient to sustain continuous combustion by flaring. Texaco engineers calculated that use of approximately 120,000 cubic feet of natural gas would be required to support combustion of the emissions for each of the larger storage tanks proposed at Kittitas (Waltemath, 1997). Since no gas line to the site is included in the proposed project design, a pipeline to the site would have to be specially constructed to support this control strategy, and an ongoing supply of natural gas would have to be identified and purchased. These factors would obviously represent a serious increase in costs for implementation of this control option, especially considering the small quantity of VOC emissions it would be used to eliminate. Finally, even if a safe location could be identified, the presence of a flare at the tank farm would be expected to greatly increase the public's apprehension regarding the potential for fire and explosion. For these reasons, the use of vapor recovery with flaring is considered technically and practically infeasible for the Kittitas site.

**Vapor recovery with refrigeration:** This type of control would entail collection of tank head space vapors, with subsequent cooling in two or more stages to condense and recover hydrocarbon products and eliminate most of the tank emissions. As a practical matter, the use of a vapor refrigeration/condensation system to control tank vapors would be difficult to manage at this site, both because of space limitations and the fact that recovered product would be a mixture of gasoline, jet fuel and diesel vapors, which could then only be routed to the transmix tank or injected at very low concentrations into a gasoline tank or down-line. The quantity of product reclaimed by a refrigeration process would, in any case, be far below a level that would justify this technology economically. Since other substantially less elaborate and less costly control systems with equal VOC emission reduction capabilities are available and because this type of control has never been applied for elimination of such a small emissions stream, vapor recovery with refrigeration is considered technically and practically infeasible for the Kittitas facility.

**Vapor recovery with carbon adsorption:** This control technology has been applied as BACT for volatile organic liquid storage tanks that were not already equipped with internal floating roofs. Based on the dispersion modeling results, a vapor recovery unit with a high efficiency carbon adsorption system for at least 99.9% control of truck rack VOC emissions is needed to prevent off-site benzene concentrations from exceeding the Washington Acceptable Source Impact Limit (ASIL) for this toxic contaminant. Accordingly, this unit is already included in the proposed project design for Kittitas (see BACT Truck Loading). Theoretically, this carbon adsorption system could be adapted to accept vapors from the storage tanks as well. However, due to the low level of tank emissions that would remain after application of the internal floating roof tanks, the considerable engineering design and expense of adapting this system to control excess tank vapors is not warranted. In any event, the ducting and connections that would be required to accomplish this adaptation would introduce a large number of additional fugitive emissions sources (components) in gas service. These emissions would occur near ground level, and their impact on predicted ground-level benzene concentrations at the fenceline may jeopardize the facility's ability to comply with the benzene ASIL, since components in gas service have the highest VOC emission factors of any equipment at the proposed facility  Since the excess tank vapors for the proposed facility will be small after application of internal floating roofs with primary and secondary seals, since add-on controls have not been required as BACT for similarly equipped tanks in Washington and elsewhere, and since the modeling results show that additional components in gas service may introduce new fenceline benzene impacts, the carbon adsorption alternative is considered technically and practically infeasible for this project.

Ranking of the Remaining Control Technologies by Control Effectiveness

This section provides a ranking of the remaining candidate VOC control options for the Kittitas storage tanks according to the annual tons of VOC emissions that would be expected to occur with each control alternative in place.  Emission estimates presented in this section for each control scenario have been obtained by applications of the EPA TANKS emission calculation program with input data that correspond to the maximum facility throughput scenario (described in the emission inventory).  In this case, the ranking of the two remaining BACT candidates according to emissions is very straightforward.  Between the two internal floating roof tank systems, the use of liquid-mounted seals results in slightly lower emissions.  However, a concern with the liquid-mounted seal design is that the primary floating log seal eventually becomes saturated with product and must be treated as a hazardous waste when it is replaced.  Thus, while the installation cost associated with this type of seal is comparable to that for the vapor mounted seal, it is not included in OPL=s preferred design for this reason.

Based on separate TANKS calculations to estimate the total annual VOC emissions for the entire proposed tank farm with each of the candidate control options, the top-down ranking in terms of VOC control efficiency is presented below.  The TANKS printouts for the cases with vapor-mounted and liquid mounted seals are provided in Appendix D

C internal floating roof with double seals (liquid mounted):  10.11 tpy VOC
C internal floating roof with double seals (vapor mounted):  14.22 tpy VOC

**BACT Determination**

Energy Impacts

Internal floating tanks without vapor recovery are not significant consumers of energy.  Any heaters or other small electrical devices associated with fuel storage at Kittitas (if any) would be common to both remaining tank designs considered in this analysis.

Environmental Impacts

Liquid-mounted primary tank seals (foam logs) installed in the Kittitas tank farm would eventually become saturated with product, and OPL would be required to replace them at approximately twice the frequency required for vapor-mounted seals. The contaminated liquid-mounted seal material constitutes a hazardous waste, and must be disposed of accordingly at an approved facility. No such concern is encountered with vapor-mounted seals.

Cost Effectiveness Comparison

Estimated costs for implementing each of the remaining control options for the Kittitas storage tanks are presented in this subsection, and the cost per unit emission reduction is evaluated for the non baseline option. Estimates of the capital and incremental annualized costs relative to the reference (baseline) emission scenario are determined for each option, using guidance provided in the EPA Control Cost Manual.

Note that the use of liquid-mounted seals on all ten tanks would not amount to the addition of an emissions control device in the usual sense of this term. While the liquid-mounted seals do reduce VOC emissions relative to vapor-mounted seals, they are considered an alternate design feature of the tanks themselves, i.e., they would be used instead of vapor-mounted seals, not as a control device to be applied in addition to vapor-mounted seals. Thus, in comparing the costs of the two alternate roof designs, it is most appropriate to consider the incremental cost associated with using liquid mounted seals rather than vapor-mounted seals on all storage tanks.

Table 6.1-11 show comparative capital costs for the two different tank designs considered in this analysis, i.e., the baseline scenario defined above and the same tank farm with liquid mounted primary and secondary seals. We have chosen to make this comparison based on data for the eight largest Kittitas tanks, since the vendor cost data obtained for the two tank designs is most appropriately applied to these tanks. The conclusions of this analysis regarding the relative costs for the two alternative designs would be unchanged if the two small tanks were included.

Table 6.1-12 completes the comparison of the candidate tank designs in terms of annualized costs for each tank scenario and calculated cost effectiveness values in dollars per ton of VOC emissions removed. For purposes of this discussion, the term Acost-effectiveness@ refers to the dollars that would be spent per ton of emissions reduced relative to the baseline emissions scenario. As demonstrated in the table, the cost-effectiveness differential between the tanks with alternate seal designs is about $2,300 per ton on an annualized basis, with the only appreciable difference being the requirement to replace liquid-mounted seals more often and dispose of them as a hazardous waste. Data provided by tank vendors and engineers from Texaco Trading & Transportation, Inc. for use in estimating costs for the different emission control alternatives are provided in Appendix D.

BACT Determination

Based on the data presented in the previous subsections, the control technology option proposed as BACT for VOC emissions from the storage tanks at Kittitas is the internal floating roof with double seals (vapor mounted). This option has a VOC emission reduction rating that is slightly less than that of the same tank configuration with liquid mounted seals, but does not entail creation and disposal of a hazardous waste, i.e., the saturated seal material, which is the primary reason for OPL=s preference of the vapor-mounted seal option. OPL will agree to permit conditions specifying the installation of the proposed controls on all storage tanks at the Kittitas facility, as well as the associated maintenance and recordkeeping requirements that are specified in 40 CFR 60 Subpart Kb.

<u>Truck Loading Rack</u>

The proposed Kittitas facility will include a loading rack capable of simultaneous loading of two tanker trucks with a design fuel transfer rate of 1,140,000 gal/hour. The proposed design of the truck rack includes a provision for the use of vapor recovery with a high efficiency carbon adsorption system to reduce emissions of VOC to the atmosphere by at least 99.9%. As shown in the section on the facility=s emissions inventory this level of control more than satisfies the requirement to limit emissions to no more than 10 mg per liter of gasoline loaded, which is stipulated by the new MACT (NESHAP) standard for this source category (40 CFR 63 Subpart R). The calculated emission rate of the facility in these units is 1 mg/liter despite the fact that, as a non-major source of hazardous pollutants as defined in 40 CFR 63 Subpart A, the Kittitas facility is not required by federal regulations to meet the 10 mg/liter limit. However, the facility is subject to the VOC control New Source Performance Standards of 40 CFR 60 Subpart XX.

Vapor recovery and carbon adsorption with a 99.9% level of VOC control is considered to be the Atop@ level of emission control available for this equipment. No truck loading facility included in the EPA BACT/LAER Clearinghouse data base was required to install a more stringent level of control. In fact the MACT standard, which the proposed control equipment will easily surpass, was selected by EPA expressly on the basis of representing the top 10% of control efficiencies for similar equipment nationwide. Since top-BACT is proposed, a full top-down evaluation of alternate systems is not required. OPL will commit to the use of the proposed carbon adsorption system, and will accept permit conditions specifying this level of control, including the associated maintenance and recordkeeping requirements, as specified in 40 CFR 60 Subpart XX.

<u>Fugitive Emissions</u>

Fugitive emissions of VOC will result from leaking valves, flanges, compressor seals and other components throughout the proposed Kittitas facility. The only feasible control option for this source is an inspection and maintenance program to identify and repair leaking components on a routine basis. OPL will agree to permit conditions requiring implementation of the monitoring, recordkeeping and reporting procedures listed in 40 CFR 60 Subpart V. This type of program is considered the top level of control feasible for fugitive VOC emissions at the Kittitas facility, and is consistent with the most stringent previous BACT findings for similar facilities. Accordingly, a detailed top-down control technology evaluation of alternate controls for fugitive VOC emissions is not required. However, to meet the benzene ASIL, zero-emissions valves and pump seals in vapor service will be utilized at the vapor recovery system. Zero emissions equipment is considered the top-level of technology used to control fugitive emission VOCs and in this case, toxics.

**TABLE 6.1-11**
**COMPARISON OF CAPITAL COSTS FOR EIGHT INTERNAL FLOATING TANKS WITH VAPOR-MOUNTED VERSUS LIQUID-MOUNTED PRIMARY AND SECONDARY SEALS AT THE OPL KITTITAS GASOLINE DISTRIBUTION FACILITY[1]**

| | **Vapor-Mounted Tank Seals** | **Liquid-Mounted Seals** |
|---|---|---|
| Direct Investment | | |
| Equipment Cost (eight 90,000 bbl tanks) | 8 x \$796,900[2] = \$6,375,200 (installed costs) | 8 x \$799,600[2] = \$6,396,800 |
| Installation Costs | \$0 (included in direct investment cost) | \$0 (included in direct investment cost) |
| Total Direct Investment (equipment + installation) | \$6,375,200 | \$6,396,800 |
| Total Indirect Investment (engineering, construction and field expenses, startup, performance tests) | \$0 (included in direct investment cost) | \$0 (included in direct investment cost) |
| Total Turnkey Costs | \$6,375,200[3] | \$6,396,800[3] |

1 For comparison of control alternatives, costs are summed for the 8 largest tanks and vendor cost data for one 90,000 bbl tank are assumed to apply to each of these tanks.
2 Installed cost data for individual 90,0000 barrel tank provided by CBI Services in letter to J. Lague (Dames & Moore) dated January 23, 1997
3 Costing procedure based on guidance in EPA=s Control Cost Manual

**TABLE 6.1-12**
**COMPARISON OF ANNUAL COSTS AND COST EFFECTIVENESS**
**FOR EIGHT INTERNAL FLOATING TANKS WITH VAPOR-MOUNTED VERSUS**
**LIQUID-MOUNTED PRIMARY AND SECONDARY SEALS**
**AT THE OPL KITTITAS GASOLINE DISTRIBUTION FACILITY[1]**

| Cost Data | Vapor-Mounted Tank Seals | Liquid-Mounted Seals |
|---|---|---|
| Direct Costs | | |
| Direct Labor | Negligible | Negligible |
| Supervision | Negligible | Negligible |
| Maintenance Labor | Negligible | Negligible |
| Replacement Parts | $4,222<br>(change seals once in 20 years)[2] | $6,333<br>(change seals twice in 20 years)[2] |
| Hazardous Waste Disposal | N/A | $8,000[3] |
| **Total Direct Costs** | **$4,222** | **$14,333** |
| Indirect Costs | | |
| Overhead - Payroll | Negligible | Negligible |
| Overhead - Plant | $1,098<br>(26% of labor plus replacement parts) | $1,647 |
| **Total Overhead Costs** | **$1,098** | **$1,647** |
| Capital Charges | | |
| G&A taxes and insurance | $255,008<br>(4% of total turnkey costs) | $255,872 |
| **Capital Recovery Factor** | **$749,089[4]<br>(11.75% of total turnkey costs)[4]** | **$751,624[4]** |
| **Total Capital Charges** | **$1,004,097** | **$1,007,496** |
| Total Annualized Costs | $1,014,737 | $1,023,476 |
| Annual Emissions for Eight Largest Tanks | $13.04 tpy | 9.28 tpy |
| Annual Emission Reduction Relative to Baseline | 0<br>(baseline scenario) | 3.76 tpy |
| Incremental Cost Effectiveness | $0<br>($/ton of VOC removal relative to baseline) | $2,324[5] |

1 For comparison of control alternatives, costs are summed for the 8 largest tanks and vendor cost data for one 90,000 bbl tank are assumed to apply to each of these tanks.
2,3 Information on tank seal replacement frequency and hazardous waste disposal costs provided by Mr. William Waltemath, Texaco Trading and Transportation, Inc., Denver, Colorado
4 Capital recovery factor based on an assumed 10% interest rate for an equipment life of 20 years
5 Costing procedure based on guidance in EPA=s Control Cost Manual

Storage Tank Losses

Storage tanks containing volatile liquids such as petroleum products exhibit losses during storage due to evaporation of the liquid (standing losses) and losses as a result of changes in liquid levels (working losses). Standing losses in tanks with internal floating roofs occur mainly as a result of improper fit between the deck seal and the wall of the tank. These seals slide against the tank wall as the deck is raised or lowered. Other penetrations in the deck, such as gauge attachments, access hatches, ladder wells, and column wells also contribute to standing losses of VOCs from storage tanks. These standing losses will be minimized through the use of primary and secondary deck seals, as required under 40 CFR Part 60, Subpart Kb and inspection of the storage tank equipment.

Working losses occur mainly due to residual liquid on the tank wall or support column during lowering of the liquid levels. The design of an internal floating roof with an external fixed roof reduces evaporative emissions due to wind loss. Pressure vents set at atmospheric pressure prevent the accumulation of vapors from approaching the flammable range.

For this project, the emission estimation procedures used for calculating VOC storage tank losses included the use of a software program entitled TANKS3, available through the EPA. This software incorporates the estimating procedures outlined by EPA (USEPA, 1995). Input parameters used for the TANKS program are provided in Table 6.1-7. Assumptions made regarding the input parameters include the following:

- Default meteorology for Yakima, Washington, was used for the model.
- The annual throughput of ethanol was based on the single tank being unloaded at equal rates throughout the entire year.
- Jet fuel (kerosene) annual throughput was estimated as one tank turnover, although the demand for jet fuel is not expected for several years. This will account for standing losses from a jet fuel tank.
- The contents of the transmix tank were assumed to consist only of gasoline, the worst-case scenario. In addition, the annual throughput of the tank was calculated as one-half of one percent of the total throughput of the combined regular and subgrade gasoline volumes stored at the facility.
- RVP values for summer and winter blend gasolines are 10 and 13 respectively.
- Throughput is entered monthly based on seasonal demand. The monthly values are presented in Table 6.1-7.

Total VOC losses for each tank using the TANKS3 model are presented in Table 6.1-13. For each tank the table presents the sum of total VOCs emitted per tank per month for the tank facility. Predicted emissions of approximately 14.22 tons per year of total VOCs are estimated from storage tank losses. Model output files are included in Appendix D.

**TABLE 6.1-13**

## TOTAL VOC EMISSIONS FROM STORAGE TANKS- OPL

| TANK | JAN | FEB | MAR | APR | MAY* | JUNE* | JULY* | AUG* | SEPT | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 157.15 | 172.89 | 187.01 | 205.97 | 167.89 | 182.21 | 195.33 | 189.11 | 234.00 | 202.54 | 175.61 | 162.51 | 2,232.22 |
| 2 | 7.07 | 8.14 | 9.13 | 10.48 | 12.15 | 13.67 | 15.10 | 14.42 | 12.53 | 10.24 | 8.33 | 7.43 | 128.69 |
| 3 | 504.09 | 551.89 | 594.78 | 657.04 | 542.68 | 586.16 | 626.01 | 607.11 | 742.14 | 641.94 | 560.16 | 520.39 | 7,134.39 |
| 4 | 419.48 | 459.37 | 495.17 | 546.92 | 451.43 | 487.71 | 520.97 | 505.19 | 617.93 | 534.52 | 466.27 | 433.09 | 5,938.05 |
| 5 | 419.48 | 459.37 | 495.17 | 546.92 | 451.43 | 487.71 | 520.97 | 505.19 | 617.93 | 534.52 | 466.27 | 433.09 | 5,938.05 |
| 6 | 419.48 | 459.37 | 495.17 | 546.92 | 451.43 | 487.71 | 520.97 | 505.19 | 617.93 | 534.52 | 466.27 | 433.09 | 5,938.05 |
| 7 | 26.52 | 26.59 | 26.66 | 26.75 | 26.86 | 26.96 | 27.05 | 27.01 | 26.88 | 26.73 | 26.61 | 26.55 | 321.17 |
| 8 | 28.11 | 28.17 | 28.23 | 28.31 | 28.41 | 28.51 | 28.59 | 28.55 | 28.44 | 28.30 | 28.18 | 28.13 | 339.93 |
| 9 | 37.68 | 37.76 | 37.84 | 37.94 | 38.07 | 38.18 | 38.29 | 38.24 | 38.10 | 37.92 | 37.78 | 37.71 | 455.51 |
| 10 | 1.17 | 1.26 | 1.34 | 1.46 | 1.60 | 1.72 | 1.84 | 1.78 | 1.63 | 1.44 | 1.27 | 1.20 | 17.71 |
| TOTALS | 2,020.23 | 2,204.81 | 2,370.50 | 2,608.71 | 2,171.95 | 2,340.54 | 2,495.12 | 2,421.79 | 2,937.51 | 2,552.67 | 2,236.75 | 2,083.19 | 28,443.77.77 |
| TPY | | | | | | | | | | | | | 14.22 |

* Months using summer blend RVP10

## TABLE 6.1-13 (CONTINUED)
## TOTAL VOC EMISSIONS FROM STORAGE TANKS - OPL

| TANK | JAN | FEB | MAR | APR | MAY* | JUNE* | JULY* | AUG* | SEPT | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 157.15 | 172.89 | 187.01 | 205.97 | 167.89 | 182.21 | 195.33 | 189.11 | 234.00 | 202.54 | 175.61 | 162.51 | 2,232.22 |
| | Summer Blend = | | 734.54 | (May through August) | | | | | | | | | |
| | Winter Blend = | | 1,497.68 | (all remaining months) | | | | | | | | | |
| | TL = | | 2,232.22 | | | | | | | | | | |
| 3 | 504.09 | 551.89 | 594.78 | 657.04 | 542.68 | 586.16 | 626.01 | 607.11 | 742.14 | 641.94 | 560.16 | 520.39 | 7,134.39 |
| | Summer Blend = | | 2,361.96 | | | | | | | | | | |
| | Winter Blend = | | 4,772.43 | | | | | | | | | | |
| | TL = | | 7,134.39 | | | | | | | | | | |
| 4-6 | 419.48 | 459.37 | 495.17 | 546.92 | 451.43 | 487.71 | 520.97 | 505.19 | 617.93 | 534.52 | 466.27 | 433.09 | 5,938.05 |
| | Summer Blend = | | 1,965.30 | | | | | | | | | | |
| | Winter Blend = | | 3,972.75 | | | | | | | | | | |
| | TL = | | 5,938.05 | | | | | | | | | | |

## Tank Truck Loading Losses

Dispensing fuel from the storage tank into tanker trucks at the main loading rack results in potential losses of VOCs at many locations. The method of loading to be utilized at this facility is bottom-filled, submerged loading with dry coupling attachments at the product-loading arms. This method is considered to be the most effective means to reduce VOC losses during loading. The tanker truck is filled from the bottom of the tanker with the arm submerged below the liquid level. Dry-break couplings on the loading arms virtually eliminate product spills and vapor emissions when decoupling the arms from the trucks. Product cannot be loaded until all safety and vapor recovery equipment are properly affixed to the truck. The vapor recovery system consists of a vapor recovery unit and processing of displaced vapors from the truck tank. Leaks from tank trucks are virtually eliminated using vapor-tight tank trucks. Therefore, tank trucks are required to be leak-checked and verified to be vapor-tight. Estimates of VOC losses due to tank truck loading were calculated using AP-42 emission factor equations provided by the EPA (USEPA, 1995):

$\mathbf{L_l = 12.46 \times [(S*P*M) / T]}$ where:

$L_l$ = loss of VOCs per 1000 gallons of liquid loaded
S = Saturation factor of the liquid based on loading process
P = true vapor pressure of liquid loaded, pounds per square inch (psia)
M = molecular weight of vapors, pounds per pound-mole (lb/lb-mole)
T = temperature of bulk liquid loaded, ER = (EF + 460)

Assumptions regarding the loading losses included the following:

- C The only fuels to be loaded into tank trucks at the main racks were gasoline and diesel fuels.
- C Maximum throughput of the loading rack is 372,300,000 gallons per year.
- C True vapor pressure, molecular weight, and bulk temperature were extracted from the output of TANKS3 files for the appropriate fuels. Average values were calculated using monthly values from TANKS used for each season.
- C Four months (May through August) utilize RVP10 and 8 months use RVP13.
- C The breakdown of fuel dispensed at the loading rack was calculated on the equivalent demand percentages used to calculate the annual volume of stored liquids from the pipeline into the storage tanks (60 percent gasoline fuels and 40 percent diesel).
- C Summer blend equals 36% of total net throughput. (4 months * 9%) relative to total net throughput in Table 6.1-7.

Employment of a 99.9 percent efficient vapor recovery system would reduce uncontrolled, estimated total VOC losses from 907 tons per year to 0.91 tons per year. Controlled emissions assume the vapor recovery system and all control measures required by the NSPS are utilized and working properly. Fugitive emissions from VOC losses due to leaks in the loading arm flanges, pumps, and valves are included with the fugitive emission estimates for the facility. Table 6.1-14 presents emissions due to truck loading rack operations.

## TABLE 6.1-14

### TRUCK LOADING RACK VOC EMISSIONS-OPL

| Liquid Loaded | Throughput[1] (gal/yr) | Saturation Factor[2] | Molecular Weight (lb/lb-mole) | True Vapor Pressure[3] (psia) | Temperature of Liquid[3] (Rankin) | VOC Losses[4] (lb/1000 gal loaded) | Total VOC Losses (lb/yr) | 99.9% Efficiency |
|---|---|---|---|---|---|---|---|---|
| Gas-RVP 10 | 80,416,800 | 1.0 | 66 | 5.0349 | 519.38 | 7.9720 | 641,083.19 | 641.08 |
| Gas-RVP 13 | 142,963,200 | 1.0 | 62 | 5.3755 | 507.45 | 8.1834 | 1,169,929.26 | 1,169.93 |
| Diesel | 148,920,000 | 1.0 | 130 | 0.005 | 511.43 | 0.0158 | 2,358.30 | 2.36 |
| Total | 372,300,000 | | | | | | 1,813,370.75 | 1,813.37 |

**Percent Reduction by Carbon Adsorption Unit = 99% 18,133.71 lb/yr**
**0.91 tons/yr**

1 Throughput of the loading racks is based on 102 - 10,000 gal trucks loading per day for 17 hours, 365 days/year. A ratio of 60 % gas/40% diesel was assumed for the loading of gas and diesel. Gas was further broken down by blend usage. (summer blend 36% of total).

2 Saturation factor is based on the use of dedicated vapor -balanced tanker trucks

3 True vapor pressure and liquid surface temperatures are provided in the TANKS3 outputs. Averages were calculated for each blend and seasonal useage. RVP 10 is based on months May -Aug, while RVP 13 (winter) is based on the remaining months.

4 Total VOC losses are calculated using L=12.46[(S*M*P)]/T from EPA's AP -42 section 5.2.

Will 99.9% efficinecy meet 10 mg/l emission control standard?

VOCs based on 10 mg/l liquid loaded:

Total loaded:

| | | | |
|---|---|---|---|
| 372,300,000 gallons | | | |
| gas = 60% | 223,380,000 rvp10 (36%) | | 80,416,800 |
| | rvp13 (64%) | | 142,963,200 |
| disel = 40% | | | 148,920,000 |
| | | | 372,300,000 |

1,409,304,420 liters loaded

Then: 10 mg/l loaded 14,093,044,200 mg/ controlled

31,070 lb controlled

15.53 tpy emissions

Fugitive Emissions

Fugitive emissions resulting from leaks in the pipeline valves, flanges, and pump seals were estimated using guidance provided by the EPA (usepa, 1996). The agency recommends that fugitive emissions due to equipment leaks be calculated using EPA's "Protocol for Equipment Leak Emission Estimates" (USEPA, 1995). Emissions were calculated using the following equation:

**$VOC = EF_{avg} \times WT_f * N_{equip} \times Hr/yr$** where:

VOC = VOC emissions in kilograms (kg) per year per equipment in gas stream type.
$EF_{avg}$ = Average emission factor per equipment type (kg/hr/source).
$Wt_f$ = Weight fraction of VOC in the gas stream.
$N_{equip}$ = The number of pieces of equipment per type in the stream.
Hr/yr = The total number of hours of operation per year.

This calculation assumes the VOC weight fraction of the gas equals 1. Table 6.1-15 presents the `breakdown of equipment planned at the terminal facility grouped by activity, emission factors used, total VOCs per activity, and facility total fugitive VOC emissions. Total VOC emissions due to leaks are estimated at 0.41 tons per year. According to the Emission Inventory Improvement Program (EIIP) control efficiency for LDAR programs has been established in the document (EIIP, 1996). Emissions from pump seals, and valves using quarterly monitoring methods can be reduced by the percentages stated in Table 6.1-15. This percent control reduces VOC emissions to 0.24 tons per year annually. OPL will implement an LDAR program as required in 40 CFR 63 Subpart V.

**TABLE 6.1-15**
**FUGITIVE EMISSIONS FROM EQUIPMENT LEAKS - KITTITAS TERMINAL**

| Equipment Type | Type of Service | Equipment Count | Hours of operation | Weight fraction /1/ | Emission factor /2/ (kg\hr\source) | VOC emissions (kg\yr) | VOC emissions (lb\yr) | Control effectiveness applied | Controlled VOC emissions (lb\yr) |
|---|---|---|---|---|---|---|---|---|---|
| **Mainline Pumps** | | | | | | | | | |
| Pump Seals | LL | 2 | 8760 | 1.00 | 0.00054 | 9.46 | 20.91 | 45% | 11.50 |
| Pipeline Valves | LL | 13 | 8760 | 1.00 | 0.000043 | 4.90 | 10.82 | 61% | 4.22 |
| Flanges | LL | 53 | 8760 | 1.00 | 0.000008 | 3.71 | 8.21 | 0% | 8.21 |
| TOTAL VOC EMISSIONS | | | | | | | **39.94** | | **23.93** |
| **Loading Rack** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pump Seals | LL | 1 | 8760 | 1.00 | 0.00054 | 4.73 | 10.45 | 45% | 5.75 |
| Pump Seals | LL-E | 1 | 8760 | 1.00 | 0.00054 | 4.73 | 10.45 | 45% | 5.75 |

## TABLE 6.1-15 (CONTINUED)
## FUGITIVE EMISSIONS FROM EQUIPMENT LEAKS - KITTITAS TERMINAL

| Equipment Type | Type of Service | Equipment Count | Hours of operation | Weight fraction /1/ | Emission factor /2/ (kg\hr\source) | VOC emissions (kg\yr) | VOC emissions (lb\yr) | Control effectiveness applied | Controlled VOC emissions (lb\yr) |
|---|---|---|---|---|---|---|---|---|---|
| Pipeline Valves | V | 13 | 8760 | 1.00 | 0.000013 | 1.48 | 3.27 | 70% | 0.98 |
| Pipeline Valves | LL | 138 | 8760 | 1.00 | 0.000043 | 51.98 | 114.88 | 61% | 44.80 |
| Pipeline Valves | LL-E | 55 | 8760 | 1.00 | 0.000043 | 20.72 | 45.79 | 61% | 17.86 |
| Pipeline Valves | HL | 64 | 8760 | 1.00 | 0.000043 | 24.11 | 53.28 | 61% | 20.78 |
| LoadArm Valves | LL | 14 | 8760 | 1.00 | 0.000043 | 5.27 | 11.65 | 61% | 4.55 |
| Flanges | V | 25 | 8760 | 1.00 | 0.000042 | 9.20 | 20.33 | 0% | 20.33 |
| Flanges | LL | 207 | 8760 | 1.00 | 0.000008 | 14.51 | 32.06 | 0% | 32.06 |
| Flanges | LL-E | 129 | 8760 | 1.00 | 0.000008 | 9.04 | 19.98 | 0% | 19.98 |
| Flanges | HL | 104 | 8760 | 1.00 | 0.000008 | 7.29 | 16.11 | 0% | 16.11 |
| TOTAL VOC EMISSIONS | | | | | | | 338.25 | | 188.94 |
| **Incoming/Outgoing Mainline** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pump Seals | LL | 1 | 8760 | 1.00 | 0.00054 | 4.73 | 10.45 | 45% | 5.75 |
| Pipeline Valves | LL | 9 | 8760 | 1.00 | 0.000043 | 3.39 | 7.49 | 61% | 2.92 |
| Flanges | LL | 36 | 8760 | 1.00 | 0.000008 | 2.52 | 5.58 | 0% | 5.58 |
| TOTAL VOC EMISSIONS | | | | | | | 23.52 | | 14.25 |
| **Mainline Metering** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pipeline Valves | LL | 30 | 8760 | 1.00 | 0.000043 | 11.30 | 24.97 | 61% | 9.74 |
| Flanges | LL | 136 | 8760 | 1.00 | 0.000008 | 9.53 | 21.06 | 0% | 21.06 |
| TOTAL VOC EMISSIONS | | | | | | | 46.04 | | 30.80 |

## TABLE 6.1-15 (CONTINUED)
## FUGITIVE EMISSIONS FROM EQUIPMENT LEAKS - KITTITAS TERMINAL

| **Tank Metering** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pump Seals | LL | 1 | 8760 | 1.00 | 0.00054 | 4.73 | 10.45 | 45% | 5.75 |
| Pipeline Valves | LL | 14 | 8760 | 1.00 | 0.000043 | 5.27 | 11.65 | 61% | 4.55 |
| Flanges | LL | 27 | 8760 | 1.00 | 0.000008 | 1.89 | 4.18 | 0% | 4.18 |
| TOTAL VOC EMISSIONS | | | | | | | 26.29 | | 14.48 |
| **Manifold** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pump Seals | LL | 1 | 8760 | 1.00 | 0.00054 | 4.73 | 10.45 | 45% | 5.75 |
| Pipeline Valves | LL | 14 | 8760 | 1.00 | 0.000043 | 5.27 | 11.65 | 61% | 4.55 |
| Pipeline Valves | HL | 6 | 8760 | 1.00 | 0.000043 | 2.26 | 4.99 | 61% | 1.95 |
| Flanges | LL | 39 | 8760 | 1.00 | 0.000008 | 2.73 | 6.04 | 0% | 6.04 |
| Flanges | HL | 21 | 8760 | 1.00 | 0.000008 | 1.47 | 3.25 | 0% | 3.25 |
| TOTAL VOC EMISSIONS | | | | | | | 36.40 | | 21.54 |
| **Load Pumps** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pump Seals | LL | 8 | 8760 | 1.00 | 0.00054 | 37.84 | 83.63 | 45% | 46.00 |
| Pump Seals | LL-E | 2 | 8760 | 1.00 | 0.00054 | 9.46 | 20.91 | 45% | 11.50 |
| Pump Seals | HL | 4 | 8760 | 1.00 | 0.00054 | 18.92 | 41.82 | 45% | 23.00 |
| Pipeline Valves | LL | 18 | 8760 | 1.00 | 0.000043 | 6.78 | 14.98 | 61% | 5.84 |
| Pipeline Valves | LL-E | 6 | 8760 | 1.00 | 0.000043 | 2.26 | 4.99 | 61% | 1.95 |
| Pipeline Valves | HL | 12 | 8760 | 1.00 | 0.000043 | 4.52 | 9.99 | 61% | 3.90 |
| Flanges | LL | 48 | 8760 | 1.00 | 0.000008 | 3.36 | 7.43 | 0% | 7.43 |
| Flanges | LL-E | 16 | 8760 | 1.00 | 0.000008 | 1.12 | 2.48 | 0% | 2.48 |
| Flanges | HL | 32 | 8760 | 1.00 | 0.000008 | 2.24 | 4.96 | 0% | 4.96 |
| TOTAL VOC EMISSIONS | | | | | | | 191.20 | | 107.05 |

## TABLE 6.1-15 (CONTINUED)
## FUGITIVE EMISSIONS FROM EQUIPMENT LEAKS - KITTITAS TERMINAL

| **Vapor Recovery Unit** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pump Seals | V | 1 | 8760 | 1.00 | 0.00065 | 0.57 | 1.26 | 45% | 0.69 |
| Pump Seals | LL | 4 | 8760 | 1.00 | 0.00054 | 18.92 | 41.82 | 45% | 23.00 |
| Pipeline Valves | V | 8 | 8760 | 1.00 | 0.000013 | 0.91 | 2.01 | 70% | 0.60 |
| Pipeline Valves | LL | 3 | 8760 | 1.00 | 0.000043 | 1.13 | 2.50 | 61% | 0.97 |
| Flanges | V | 22 | 8760 | 1.00 | 0.000042 | 8.09 | 17.89 | 0% | 17.89 |
| Flanges | LL | 9 | 8760 | 1.00 | 0.000008 | 0.63 | 1.39 | 0% | 1.39 |
| TOTAL VOC EMISSIONS | | | | | | | 66.87 | | 44.55 |
| **Tankline 1-Transmix** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pipeline Valves | LL | 6 | 8760 | 1.00 | 0.000043 | 2.26 | 4.99 | 61% | 1.95 |
| Flanges | LL | 10 | 8760 | 1.00 | 0.000008 | 0.70 | 0.70 | 0% | 1.55 |
| TOTAL VOC EMISSIONS | | | | | | | 6.54 | | 3.50 |
| **Tankline 2-Ethanol** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pipeline Valves | LL-E | 3 | 8760 | 1.00 | 0.000043 | 1.13 | 2.50 | 61% | 0.97 |
| Flanges | LL-E | 5 | 8760 | 1.00 | 0.000008 | 0.35 | 0.77 | 0% | 0.77 |
| TOTAL VOC EMISSIONS | | | | | | | 3.27 | | 1.75 |
| **Tanklines 3, 5 & 6 - Gas (Each)** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pipeline Valves | LL | 4 | 8760 | 1.00 | 0.000043 | 1.51 | 3.33 | 61% | 1.30 |
| Flanges | LL | 8 | 8760 | 1.00 | 0.000008 | 0.56 | 1.24 | 0% | 1.24 |
| TOTAL VOC EMISSIONS-each tankline | | | | | | | 4.57 | | 2.54 |
| TOTAL VOC EMISSIONS | | | | | | | 13.71 | | 7.61 |
| **Tankline 4-Gas** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |
| Pipeline Valves | LL | 5 | 8760 | 1.00 | 0.000043 | 1.88 | 4.16 | 61% | 1.62 |
| Flanges | LL | 10 | 8760 | 1.00 | 0.00008 | 0.70 | 1.55 | 0% | 1.55 |
| TOTAL VOC EMISSIONS | | | | | | | 5.71 | | 3.17 |
| **Tanklines 7, 8, 9 & 10 -Diesel/Turbine (Each)** | | | | | | | | | |
| **Equipment type** | **Type of Service** | **Equipment Count** | **Hours of operation** | **Weight fraction /1/** | **Emission factor /2/ (kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** | **Control effectiveness applied** | **Controlled VOC emissions (lb\yr)** |

## TABLE 6.1-15 (CONTINUED)
## FUGITIVE EMISSIONS FROM EQUIPMENT LEAKS - KITTITAS TERMINAL

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pipeline Valves | HL | 4 | 8760 | 1.00 | 0.000043 | 1.51 | 3.33 | 61% | 1.30 |
| Flanges | HL | 8 | 8760 | 1.00 | 0.000008 | 0.56 | 1.24 | 0% | 1.24 |
| TOTAL VOC EMISSIONS-each tankline | | | | | | | 4.57 | | 2.54 |
| TOTAL VOC EMISSIONS | | | | | | | 18.28 | | 10.15 |
| FACILITY-WIDE FUGITIVE EMISSIONS | | | | | | | 816.01 | | 471.71 |
| TONS PER YEAR | | | | | | | 0.41 | | 0.24 |

Uses Gas. Distr. MACT/API emission factors: LL= light liquid (gasoline): LL-E=ethanol: HL= heavy liquid (diesel/turbine): V=vapor service.

LDAR program according to 40 CFR 61 SUBPART V: source: EIIP, 12/96

Summary of VOC Emissions

The total VOC emissions calculated for the Kittitas Terminal are summarized in Table 6.1-16. The estimated 15.39 tons per year of VOC emissions is less than the 100 ton threshold which defines a major source (WAC 173-44-030)

## TABLE 6.1-16
## SUMMARY OF VOC EMISSIONS AT THE KITTITAS TERMINAL

| | Emission (tons per year) |
|---|---|
| Storage Tank Losses | 14.22 |
| Truck Loading Losses | 0.91 |
| Fugitive Emissions | 0.26 |
| Total VOC Emissions | 15.39 |

Toxic Pollutant Emissions Estimates

Toxic pollutants are regulated under WAC 173-460. Any new source of listed toxic emissions must demonstrate T-BACT is utilized as an emission control. New sources must also show compliance with Ambient Significant Impact Levels (ASILs) for Class A and Class B toxics.

Emission estimates of toxic pollutants were calculated utilizing a speciation method. This method requires the use of published speciation profiles for the fuels stored at the bulk terminal facility. The state of California Air Resources Board (CARB) publishes VOC species profiles for each of the fuels at the facility (CARB, 1991). The speciation profiles are included in Appendix G for each fuel. Total predicted VOCs from each source were multiplied by the corresponding speciation factor to produce toxic pollutant emission estimates for the corresponding Class A and Class B toxic. For the storage tanks, total VOCs per gasoline blend were calculated by adding the VOCs from each month using the corresponding RVP blend. For example, the summer blend RVP10 VOC value in Table 6.1-17 was calculated by adding predicted VOC emissions presented in Table 6.1-13 for the months of May through August. Even though the RVP restriction period extends to September 15, emissions for the complete month of September were assumed to have an associated RVP blend of 13- a worst-case scenario. Small Quantity Emission Rates (SQER) and corresponding ASILs for each of the pollutants are shown in Tables 6.1-17 through 6.1-19.

**TABLE 6.1-17**

## TOXIC EMISSIONS FROM STORAGE TANKS

| Storage Tank | | Total VOCs emitted (lb/yr) | Pollutant Emissions (lb/yr) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Xylene | Toluene | Benzene | n-Hexane | Cyclo-pentane | Cyclo-hexane | n-Heptane | Isomers of Hexane | Ethyl Alcohol | Methyl-cyclo-hexane | Ethyl-benzene | Total HAPs |
| 1- Transmix- | RVP 10 | 734.54 | 0.73 | 4.41 | 5.14 | 13.22 | 5.14 | 1.47 | 2.20 | 34.52 | 0.00 | 0.73 | 0.00 | 67.58 |
| | RVP 13 | 1,497.68 | 14.98 | 29.95 | 22.47 | 26.96 | 8.99 | 7.49 | 11.98 | 58.41 | 0.00 | 7.49 | 3.00 | 191.70 |
| 2- Ethanol | | 128.69 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 128.69 | 0.00 | 0.00 | 128.69 |
| 3- Premium- | RVP 10 | 2,361.96 | 2.36 | 14.17 | 16.53 | 42.52 | 16.53 | 4.72 | 7.09 | 111.01 | 0.00 | 2.36 | 0.00 | 217.30 |
| | RVP 13 | 4,772.43 | 47.72 | 95.45 | 71.59 | 85.90 | 28.63 | 23.86 | 38.18 | 186.12 | 0.00 | 23.86 | 9.54 | 610.87 |
| 4- Regular- | RVP 10 | 1,965.30 | 1.97 | 11.79 | 13.76 | 35.38 | 13.76 | 3.93 | 5.90 | 92.37 | 0.00 | 1.97 | 0.00 | 180.81 |
| | RVP 13 | 3,972.75 | 39.73 | 79.46 | 59.59 | 71.51 | 23.84 | 19.86 | 31.78 | 154.94 | 0.00 | 19.86 | 7.95 | 508.51 |
| 5- Regular- | RVP 10 | 1,965.30 | 1.97 | 11.79 | 13.76 | 35.38 | 13.76 | 3.93 | 5.90 | 92.37 | 0.00 | 1.97 | 0.00 | 180.81 |
| | RVP 13 | 3,972.75 | 39.73 | 79.46 | 59.59 | 71.51 | 23.84 | 19.86 | 31.78 | 154.94 | 0.00 | 19.86 | 7.95 | 508.51 |
| 6- Regular- | RVP 10 | 1,965.30 | 1.97 | 11.79 | 13.76 | 35.38 | 13.76 | 3.93 | 5.90 | 92.37 | 0.00 | 1.97 | 0.00 | 180.81 |
| | RVP 13 | 3,972.75 | 39.73 | 79.46 | 59.59 | 71.51 | 23.84 | 19.86 | 31.78 | 154.94 | 0.00 | 19.86 | 7.95 | 508.51 |
| 7- High Sulfur Diesel | | 321.17 | 0.00 | 0.00 | 0.00 | 28.91 | 0.00 | 3.21 | 27.62 | 9.64 | 0.00 | 0.00 | 0.00 | 69.37 |
| 8- High Sulfur Diesel | | 339.93 | 0.00 | 0.00 | 0.00 | 30.59 | 0.00 | 3.40 | 29.23 | 10.20 | 0.00 | 0.00 | 0.00 | 73.42 |
| 9- Lo Sulfur Diesel | | 455.51 | 0.00 | 0.00 | 0.00 | 41.00 | 0.00 | 4.56 | 39.17 | 13.67 | 0.00 | 0.00 | 0.00 | 98.39 |
| 10- Jet Turbine Fuel | | 17.71 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 |
| Total (lb/yr) | | 28,443.77 | 190.88 | 417.72 | 335.77 | 589.75 | 172.08 | 120.09 | 268.53 | 1,165.49 | 128.69 | 99.93 | 36.38 | 3,525.31 |
| TOTAL (Tons/yr) | | 14.22 | 0.10 | 0.21 | 0.17 | 0.29 | 0.09 | 0.06 | 0.13 | 0.58 | 0.06 | 0.05 | 0.02 | 1.76 |
| Small Quantity Emission Rate - lb/yr | | | 43748 | 43748 | 20 | 22750 | 43748 | 43748 | 43748 | 43748 | 43748 | 43748 | 43748 | |
| ASIL - Class A Toxic (ug/m3)(Annual) | | | | | 0.12 | | | | | | | | | |
| ASIL - Class B Toxic (ug/m3)(24-hr) | | | 1500 | 400 | | 200 | 5700 | 3400 | 5500 | 5900 | 6300 | 5400 | 1000 | |
| Exceeds SQER | | | | | x | | | | | | | | | |

**TABLE 6.1-18**

## AIR TOXICS EMISSIONS
## CROSS CASCADES PIPE LINE PROJECT-TRUCK LOADING LOSSES

| Truck Loading - Main Rack- 99% Carbon adsorption unit | Total VOCs emitted (lb/yr) | Toxic Emissions (lb/yr) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Xylene** | **Toluene** | **Benzene** | **n-Hexane** | **Cyclo-pentane** | **Cyclo-hexane** | **n-Heptane** | **Isomers of Hexane** | **Ethyl Alcohol** | **Methyl-cyclo-hexane** | **Ethyl-benzene** | **Total HAPs** |
| Gasoline - RVP 10 | 641.08 | 0.64 | 3.85 | **4.49** | 11.54 | 4.49 | 1.28 | 1.92 | 30.13 | 0.00 | 0.64 | 0.00 | 58.98 |
| Gasoline - RVP 13 | 1,169.93 | 11.70 | 23.40 | **17.55** | 21.06 | 7.02 | 5.85 | 9.36 | 45.63 | 0.00 | 5.85 | 2.34 | 149.75 |
| Diesel - All grades | 2.36 | 0.00 | 0.00 | **0.0** | 0.21 | 0.00 | 0.02 | 0.20 | 0.07 | 0.00 | 0.00 | 0.00 | 0.51 |
| Jet Turbine Fuel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total (lb/yr) | 1,813.37 | 12.34 | 27.25 | **22.04** | 32.81 | 11.51 | 7.16 | 11.49 | 75.83 | 0.00 | 6.49 | 2.34 | 209.24 |
| TOTAL (Tons/yr) | 0.91 | 0.01 | 0.01 | **0.01** | 0.02 | 0.01 | 0.00 | 0.01 | 0.04 | 0.00 | 0.00 | 0.00 | 0.10 |
| Small Quantity Emission Rate - lb/yr | | 43,748 | 43,748 | **20** | 22,750 | 43,748 | 43,748 | 43,748 | 43,748 | 43,748 | 43748 | 43748 | |
| ASIL - Class A Toxic (ug/m3)(Annual) | | | | **0.12** | | | | | | | | | |
| ASIL - Class B Toxic (ug/m3)(24-hr) | | 1,500 | 400 | | 200 | 5,700 | 3,400 | 5,500 | 5,900 | 6,300 | 5,400 | 1,000 | |
| *Exceeds SQER* | | | | ***x*** | | | | | | | | | |

**TABLE 6.1-19**

## AIR TOXICS EMISSIONS
## CROSS CASCADES PIPE LINE PROJECT-FUGITIVE EMISSIONS

| Fugitive Emissions from the Kittitas Terminal | Total VOCs emitted (lb/yr) | Toxic Emissions (lb/yr) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Xylene | Toluene | Benzene | n-Hexane | Cyclo-pentane | Cyclo-hexane | n-Heptane | Isomers of Hexane | Ethyl Alcohol | Methyl-cyclo-hexane | Ethyl-benzene | Total HAPs |
| Gasoline - RVP 10 | 117.49 | 0.12 | 0.70 | **0.82** | 2.11 | 0.82 | 0.23 | 0.35 | 5.52 | 0.00 | 0.12 | 0.00 | 10.81 |
| Gasoline - RVP 13 | 208.88 | 2.09 | 4.18 | **3.13** | 3.76 | 1.25 | 1.04 | 1.67 | 8.15 | 0.00 | 1.04 | 0.42 | 26.74 |
| Diesel - All grades | 81.55 | 0.00 | 0.00 | **0.00** | 7.34 | 0.00 | 0.82 | 7.01 | 2.45 | 0.00 | 0.00 | 0.00 | 17.61 |
| Jet Turbine Fuel | 2.54 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ethanol | 61.26 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 61.26 | 0.00 | 0.00 | 61.26 |
| Total (lb/yr) | 471.71 | 2.21 | 4.48 | **3.96** | 13.21 | 2.08 | 2.09 | 9.04 | 16.11 | 61.26 | 1.16 | 0.42 | 116.42 |
| TOTAL (Tons/yr) | 0.24 | 0.00 | 0.00 | **0.00** | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.00 | 0.00 | 0.06 |
| Small Quantity Emission Rate - lb/yr | | | | | | | | | | | | | |
| ASIL - Class A Toxic (ug/m3)(Annual) | | | | | | | | | | | | | |
| ASIL - Class B Toxic (ug/m3)(24-hr) | | | | | | | | | | | | | |
| *Exceeds SQER* | | | | ***x*** | | | | | | | | | |

### 6.1.5.2 Pump Station and Pasco Delivery Facility Emission Calculations

**Construction**

There is currently no specific information available to estimate construction emissions at the pump stations. However, due to the small site areas required, site disturbance during construction of the pump stations is not expected to generate significant fugitive emissions.

**Operation**

The operation of the Thrasher, North Bend, Stampede, Beverly Burke, and Othello pump stations and the Pasco delivery facility are not expected to produce emissions of criteria pollutants. All equipment at each of the stations is operated electrically and therefore emissions would be negligible. However, leaks from equipment are a potential source of fugitive VOC emissions.

All of the pump stations have similar design, with the exception of the Thrasher Station. Additional valves, pipeline hardware, and connections will be required at this station and at the Pasco delivery facility, as they tie into either an existing pipeline or other existing delivery facilities. Predicted emissions for the Thrasher Station, Pasco delivery facility and all other pump stations are presented in Table 6.1-20. The rationale used to calculate fugitive emissions from the pump stations is the same used for the calculation of fugitive VOC losses from equipment leaks at the Kittitas Terminal. The delivery facility and each of the pump stations are expected to emit less than 1 ton per year of VOCs, and is therefore considered an insignificant source. The pump stations and the Pasco delivery facility will not require registration with the State due to insignificant emissions.

Toxic pollutant emission calculations were limited to benzene, the only toxic pollutant of concern at the Kittitas Terminal. Benzene emissions from the Thrasher Station and the Pasco delivery facility were estimated using the benzene percent constituent of RVP13 gasoline, 1.5%. Total benzene emitted is less than 3.0 pounds per year, well below the SQER for benzene. All other pump stations were estimated to emit less than 2.0 pounds per year of benzene. The pump stations and the Pasco delivery facility are therefore considered an insignificant source for toxic pollutants and do not require impact modeling to demonstrate compliance with the benzene ASIL.

**TABLE 6.1-20**
**FUGITIVE EMISSIONS FROM PUMP STATIONS**

| **Thrasher Pump Station:** | | | | | | |
|---|---|---|---|---|---|---|
| **Equipment type** | **Equipment count** | **Hours of operation** | **Weight fraction**[1] | **Emission factor**[2] **(kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** |
| Pump Seals | 3 | 8760 | 1.00 | 0.00054 | 14.19 | 31.36 |
| Pipeline Valves | 90 | 8760 | 1.00 | 0.0000416 | 33.90 | 74.92 |
| Flanges/Connectors (Pairs) | 73 | 8760 | 1.00 | 0.000038 | 5.12 | 11.31 |
| TOTAL VOC EMISSIONS | | | | | 53.21 | 117.59 |
| TONS PER YEAR VOCs | | | | | | 0.06 |
| **Pasco Delivery Facility** | | | | | | |
| **Equipment type** | **Equipment count** | **Hours of Operation** | **Weight fraction**[1] | **Emission factor**[2] **(kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** |
| Pump Seals | 4 | 8760 | 1.00 | 0.00054 | 18.92 | 41.82 |
| Pipeline Valves | 128 | 8760 | 1.00 | 0.000043 | 48.22 | 106.56 |
| Flanges/Connectors | 173 | 8760 | 1.00 | 0.000008 | 12.12 | 26.79 |
| TOTAL VOC EMISSIONS | | | | | 79.26 | 175.17 |
| TONS PER YEAR VOCs | | | | | | 0.09 |
| **All Other Pump Stations** | | | | | | |
| **Equipment type** | **Equipment count** | **Hours of operation** | **Weight fraction**[1] | **Emission factor**[2] **(kg\hr\source)** | **VOC emissions (kg\yr)** | **VOC emissions (lb\yr)** |
| Pump Seals | 3 | 8760 | 1.00 | 0.00054 | 14.19 | 31.36 |
| Pipeline Valves | 50 | 8760 | 1.00 | 0.000043 | 18.83 | 41.62 |
| Flanges/Connectors (Pairs) | 38 | 8760 | 1.00 | 0.000008 | 2.66 | 5.89 |
| TOTAL VOC EMISSIONS | | | | | 35.69 | 78.89 |
| TONS PER YEAR VOCs | | | | | | 0.04 |

[1] Assumes VOC content of fuel = 100%     EQ: VOC = avg EF * wtF * Nequip* hr/yr
[2] Revised 1995 leaks document emission factors using light liquid service.

### 6.1.5.3 Pipeline Construction Emissions Calculations

Air pollution emissions during the construction of the pipeline can arise from a variety of activities such as grading, trenching, pipewelding and laying, and backfilling. Sources of emissions during construction activities include fugitive dust and construction equipment exhaust. Construction methods for the pipeline are presented in sections 2.3, 2.12, and 2.13. Activities emissions estimates can be calculated based on the available information regarding construction.

**Fugitive Emissions**

Impacts of Construction Dust Emissions

The pipeline construction effort will introduce pollutant emissions due to exhaust from equipment and vehicles involved in preparing the route, installing pipe and backfilling the trench, as well as fugitive dust generated by earthmoving activities and travel on unpaved surfaces. Air quality impacts due to these activities will be localized and temporary, with all activity concluded at any point along the pipeline in just a few days.

Equipment exhaust emissions will be far below the levels that would cause exceedances of the standards for CO, $SO_2$, and $NO_x$, and will occur for only a short time at any location. The only construction sources that are considered capable of impacts that may approach applicable ambient standards are those activities that will produce fugitive dust (TSP and $PM_{10}$). Accordingly, a dispersion modeling analysis was conducted to determine the maximum concentrations of these pollutants at points adjacent to a typical section of the pipeline route. The only ambient standards that apply to particulate matter are daily and annual standards. For temporary construction activities, only the 24-hour standards for TSP (Washington) and $PM_{10}$ (Federal and Washington) are relevant.

Based on information provided by OPL and bid packages from prospective pipeline construction contractors, the following basic scenario was developed to describe the construction process at any point along the right of way.

| | |
|---|---|
| First day: | Grading, clearing and trenching |
| Second day: | Pipeline installation and welding |
| Third day: | Backfilling of the trench and re-grading |

The section of the route for which any of these activities can be completed in a 12-hour workday is about 12,000 feet, which translates to a rate of 1,000 feet per hour. Watering will be applied as required to control dust emissions. We have assumed a 50% reduction in uncontrolled emissions due to this watering. Total daily dust emissions (lb/day) for the three activities are 60 lb/day for trenching and grading, 165 lb/day for traveling on unpaved surfaces, and 60 lb/day for backfilling. Note that the estimated dust emissions for the third day are identical to those for the first day, since one activity is the reverse of the other. Dust emissions for the second day will be generated by two categories of vehicles traveling on unpaved areas: (1) four 18-wheel semi trucks that will make a series of round trips to deliver pipe for installation; and (2) approximately 84 general service vehicles used for delivering personnel, equipment and supplies to various points along the route. Since the total emissions calculated for the site preparation and site restoration activities, were very similar to those for pipe-laying activities, the dispersion modeling analysis evaluated 24-hour TSP and $PM_{10}$ emissions for both the site preparation and pipeline installation.

The ISCST3 model was used for evaluation of these dust impacts. Figure 6.1-8 shows the representation of pipeline construction emissions used in the dispersion modeling analysis, and the locations of receptors. A similar set of receptors could be used at any distance along the right-of Bway with the same results, since these activities will occur temporarily all along the pipeline route as construction progresses. Dust emissions from all activities were represented as a series of square volume sources 50 feet (15.24 meters) on a side. Each source was assumed to be one meter high, to account for the initial mixing that occurs as the ground-level dust is mechanically generated.

FIGURE 6.1-8 - CONSTRUCTION MODELING SCENARIO

Total daily emissions over a workday would be spread evenly among 240 such sources laid end-to-end, i.e., a 12,000-foot section. In all of the simulations described in this section, we have assumed that the impacts at any intermediate receptor point along this distance would be affected only by the emissions from the 20 nearest volume sources, i.e., 10 sources on either side, over a total distance of 1,000 feet. In keeping with guidance provided in the ISCST3 user's guide, the emissions along this distance were actually represented as 10 volume sources separated by 50 foot spaces, as illustrated in Figure 6.1-7. A series of receptors were spaced at 10-meter intervals along a line perpendicular to the right-of-way.

The full set of generic meteorological input conditions provided with the EPA SCREEN3 model was used for each of the construction emission simulations. Each SCREEN3 combination of wind speed and atmospheric stability category was combined with a series of wind directions at 10-degree intervals from 10 degrees to 170 degrees relative to the pipeline direction, i.e., the directions that could transport construction emissions toward receptors on one side of the pipeline. Since the source is symmetrical, only one-half of the possible 360 degree direction range was modeled. The ISCST3 model predicts hourly average concentrations. Maximum 24-hour particulate concentrations were constructed from the highest hourly values obtained over the full set of meteorological inputs for each of the component emission events during the same day.

Emissions due to the vehicles on the unpaved surfaces were calculated using the AP-42 formula:

$$E \text{ (lb/vehicle mile)} = 5.9\ k\ (s/12)(s/12)\ (W/3)^{0.7}(w/4)^{0.5}$$

The values used in this equation for the parameters to represent conditions along the right-of-way and the vehicles that will be in operation during the pipe-laying procedure were as follows:

| | |
|---|---|
| k = Particle size multiplier | (0.8 for TSP and 0..36 for $PM_{10}$) |
| s = Silt content | (8%) |
| S = Vehicle speed | (10 mph) |

W = Mean vehicle weight (2 tons for service trucks, 10 tons for semi trucks)

w = Mean number of wheels per vehicle (6 wheels for service trucks and 18 for semi trucks).

The modeling scenario used to estimate the peak impact of these emissions at the receptors adjacent to the right-of-way was developed as follows:

Each pipe-hauling truck trip was assumed to start at the beginning point of the day's construction activity and to make trips along the construction spread to deliver pipe in 800-foot loads. Thus individual round trips would have lengths of 800 x 2 = 1,600 feet, 3,200 feet, and so on, out to a round trip of 12,000 feet x 2 = 24,000 feet. The total number of such round trips in a day is 15, and the total distance traveled by these trucks in a day is about 36 miles. Just over one large truck round trip per working hour would pass any point along the day's construction spread. In addition, we assumed that each of the 84 service trucks would make, on average, one round trip of the 12,000 foot construction distance during the course of a workday, and that the first and second legs of the trip for each truck occurred during the same two hours.

Thus the modeling for the day of pipe-laying activity includes 2 hours when only two pipe-hauling truck trips would pass the receptor array, and 10 additional hours when two pipe-laying trucks plus 84 service trucks would pass by. The 24-hour concentrations used for comparison with ambient standards were formed by weighing the maximum predicted hourly concentrations for the two scenarios by 2/24 and 10/24, respectively and these results were added. No emissions from construction activity would occur for the remaining twelve nighttime and early morning hours.

Separate modeling was conducted for grading and trenching operations, which would occur on the day before the pipe-laying activity. The emissions scenario used in this case was established as follows.

Dust due to grading was calculated using the scraping formula for $PM_{10}$ provided in the EPA document, Control of Fugitive Dust Sources (Chapter 5), i.e.,

$$E = 1.6438 \text{ lb/scraper unit/mile}$$

Emissions of $PM_{10}$ were assumed to be approximately 50% of TSP emissions. A group of four motor graders was assumed to travel over the entire 12,000 foot section once during the work day (1,000 feet per hour.) Trenching emissions were estimated by means of the AP-42 emission formula for bulldozing:

$$E \text{ (kg/hour)} = 0.45\,(s)^{1.5}(M^{1.4})$$

where:

s = Silt content (8%)

M = Moisture content (2.2 % - minimum)

For modeling purposes, the portions of total daily dust that would occur within the 1,000 foot portion of the right-of-way centered on the model receptor line were distributed over ten 50-foot volume sources in the same manner as the vehicle emissions for the pipe-laying scenario. Separate sets of simulations were conducted for the two one-hour periods when graders and trenching equipment would pass through this area. Daily $PM_{10}$ and TSP concentrations were estimated by adding these contributions and dividing by 24 hours.

Maximum predicted 24-hour concentrations of $PM_{10}$ and TSP (in ug/m$^3$) at the seven receptor distances from the right-of-way are shown below for both the site preparation and pipe-laying scenarios described above.

| Receptor Distance (m) | Site Preparation | | Pipe-Laying | |
|---|---|---|---|---|
| | TSP | PM10 | TSP | PM10 |
| 10 | 157 | 71 | 332 | 149 |
| 20 | 128 | 58 | 272 | 122 |
| 30 | 112 | 50 | 236 | 106 |
| 40 | 125 | 56 | 201 | 90 |
| 50 | 79 | 35 | 167 | 75 |
| 60 | 71 | 32 | 151 | 68 |
| 70 | 64 | 29 | 136 | 61 |

These predicted maximum values may be compared with the Federal and Washington 24-hour $PM_{10}$ standard of 150 ug/m$^3$ and the Washington TSP standard (also 150 ug/m$^3$). No values in excess of the $PM_{10}$ standard are predicted to occur solely due to construction emissions. The maximum concentrations predicted in the model simulations occurred with light wind speeds and stable conditions, i.e. not the conditions that would cause high background levels of windblown dust. It is possible, depending on the concurrent background concentration, that total $PM_{10}$ levels (including background) may exceed the 24-hour standards within the first 50 meters or so from the pipeline while either the site preparation or pipe-laying activity is in progress.

TSP levels due to construction on the day of pipe-laying are predicted to exceed the Washington standard within about 60 meters from the right-of-way. With the addition of background concentrations, total TSP levels above the standard may occur to a distance of 100 meters or more. However, the very short duration and localized nature of these activities at any particular location should eliminate this as a real concern.

Dust control will consist of:

1. Watering the right-of-way periodically, as necessary.

2. Applying gravel to access roads where traffic volume is high and where the road surface will need improvement.

3. Curtailing construction activities when high winds are contributing to excessive dust.

4. Limiting speed limit to 10 mph.

### 6.1.5.4 Toxic Pollutant Impact Assessment

Toxic pollutant emissions must comply with requirements established by Ecology in WAC 173-460. Compliance with ASILs for a toxic pollutant can be demonstrated by using either of two methods; 1) meet Small Quantity Emission Rates (SQER) for each toxic pollutant emitted, or 2) use air dispersion modeling to demonstrate that concentrations of toxic air pollutants do not exceed the ASIL for that pollutant.

Benzene emissions from the Kittitas Terminal operations will equal 362 pounds per year, exceeding the SQER of 20 pounds per year. Therefore, dispersion modeling was performed to demonstrate compliance with the benzene ASIL (0.12 micrograms per cubic meter).

Modeling Methodology

Toxic pollutant modeling for benzene concentrations at and beyond the terminal property was performed using ISCLT3, an EPA-approved long-term dispersion model. This model was chosen because of its ability to accommodate numerous types of sources. The long-term version of ISC used was preferable to the short term version because the benzene ASIL is a long-term annual standard. Also, ISCLT3 is specifically designed to use a STAR meteorological data format.

STAR data combines wind data and stability into a joint frequency array, averaging numerous years of surface meteorology into one data file. Because there is no on-site surface meteorology available, a five-year data set was purchased from NCDC for an obsolete site at Bower's Field in Ellensburg. Ecology's modeler was consulted on this methodology prior to purchase of the data. Data from this obsolete site is the only data available within close proximity to the proposed Kittitas Terminal. Using five years of annualized data from a nearby representative site is an approved substitution method, as suggested in the Guidance Air Quality Models.

Each pollutant-emitting source at the facility was considered in the modeling. The sources include:

- all storage tanks in gasoline service which emit benzene;
- all associated fugitive equipment which emits benzene;
- all terminal equipment which emits fugitive emissions of benzene;

- emissions from the vapor recovery system.

Because benzene emissions from these sources are fugitive in nature, all sources were treated as volume sources, with the exception of the VRS. Each volume source was determined to be either a ground-level, or an elevated source. For the case of the storage tanks, the point of emissions was determined to be an elevated volume source where the volume of the source and release height were calculated using the following method:

First, the area of the source was considered equal to the area of the fixed-f\roof cone. This assumes atmospheric vents are placed anywhere about the circumference at the top of the shell wall. The cone area ($3.14r^2$) was calculated and an equivalent square volume was determined as $L^2$. (The volume sources in ISC must be cube-shaped with equivalent sides.) Each of the cones heights was assumed to equal 3 feet.

Second, the release height was assumed equal to the height of the tank.
Third, initial lateral and vertical dimensions of the source were calculated using:
vertical = release height/2.15, and
lateral = source width /4.3.

Each ground-level source input parameter was determined by estimating the width and height of the source at the location of expected fugitive leaks. The release height was determined to be the center of the volume source. the methodology chosen was consistent with guidelines for estimating volume sources presented in Volume II of the ISC user's guide.

Each model input parameter for each volume source is presented in Table 6.1-21. The VRS was treated as a point source in the model run. Stack parameters were provided by the vendor for the 99.9% carbon adsorption unit. Stack parameters included:

- stack temperature = 293 Kelvin (1° above ambient average)
- stack velocity = 6.36 m/s
- stack height = 6.1 m
- stack diameter = 0.1524 m.

Results from the modelling indicate that the maximum concentration of 0.1 ug/m3 occurs along the west border. This concentration meets the designated benzene ASIL of 0.12 ug/m3.

**TABLE 6.1-21**
**DISPERSION MODELING INUT PARAMETERS**

| **Storage Tanks** | **VOC Emissions** | | **Benzene Emissions** | | **Equivalent Width (m)** | **Release Height (m)** | **Lateral Dimension (m)** | **Vertical Dimension (m)** |
|---|---|---|---|---|---|---|---|---|
| Elevated Volume Sources | lb/yr | g/sec | lb/yr | g/sec | | | (L/4.3) | (H/2.15) |
| 1 transmix | 2,232.22 | 0.03211 | 27.607 | 0.000397 | 7.62 | 12.19 | 3.14 | 0.43 |
| 2 ethanol | 128.69 | 0.00185 | 0.000 | 0.000000 | 7.62 | 12.19 | 3.14 | 0.43 |
| 3 prem | 7,134.39 | 0.10262 | 88.120 | 0.001267 | 22.86 | 14.63 | 9.4 | 0.43 |
| 4 gas | 5,938.05 | 0.08541 | 73.348 | 0.001055 | 19.5 | 14.63 | 8.04 | 0.43 |
| 5 gas | 5,938.05 | 0.08541 | 73,348 | 0.001055 | 34.57 | 14.63 | 8.04 | 0.43 |
| 6 gas | 5,938.05 | 0.08541 | 73.348 | 0.001055 | 34.57 | 14.63 | 8.04 | 0.43 |
| 7 hs diesel | 321.17 | 0.00462 | 0.000 | 0.00000 | 34.57 | 14.63 | 8.04 | 0.43 |
| 8 hs diesel | 339.93 | 0.00489 | 0.000 | 0.000000 | 32.41 | 14.63 | 7.54 | 0.43 |
| 9 ls diesel | 455.51 | 0.00655 | 0.000 | 0.000000 | 39.17 | 14.63 | 9.11 | 0.43 |
| 10 jet turbine | 17.71 | 0.00025 | 0.000 | 0.000000 | 34.57 | 14.63 | 8.04 | 0.43 |
| **Subtotal** | **28443.77** | **0.40911** | **335.772** | **0.004829** | | | | |
| **Vapor Recovery Unit** (Point Source-99.9%) | 1,813 | 0.01826 | 22.037 | 0.000317 | ** | ** | ** | ** |
| **Fugitive Emission Sources-Volume Sources** Mainline pumps | 23.93 | 0.00034 | 0.190 | 0.000004 | 26.29 | 1.524 | 6.11 | 1.42 |
| Loading Rack | 188.94 | 0.00272 | 1.315 | 0.000019 | 22.86 | 2.29 | 5.31 | 2.13 |
| Incoming/Outgoing Mainline | 14.25 | 0.00020 | 0.173 | 0.00002 | 12.19 | 0.46 | 2.84 | 0.43 |
| Mainline Metering | 30.80 | 0.00044 | 0.373 | 0.000005 | 33.147 | 0.46 | 7.71 | 0.425 |
| Tank Metering | 14.48 | 0.00021 | 0.175 | 0.000003 | 30.86 | 0.46 | 3.99 | 0.425 |
| Manifold | 21.54 | 0.00031 | 0.198 | 0.000003 | 19.43 | 1.52 | 4.52 | 1.42 |
| Load Pumps | 107.05 | 0.00154 | 0.718 | 0.000010 | 20 (2 equal sources) | 0.46 | 9.3 | 0.43 |
| Vapor Recovery Unit (Volume Source) | 44.55 | 0.00064 | 0.540 | 0.000008 | 3.048 | 1.52 | 2.13 | 1.42 |
| Tankline 1 | 3.50 | 0.00005 | 0.042 | 0.000001 | 3.048 | 0.61 | 0.71 | 0.567 |
| Tankline 2 | 1.75 | 0.00003 | 0.000 | 0.000000 | 0.91 | 0.61 | 0.21 | 0.567 |
| Tanklines 3, 5, & 6 | 7.61 | 0.00011 each | 0.031 | 0.000000 4 each | 3.048 1.5 (5&6) | 0.61 | 0.71 0.35 (5&6) | 0.567 |

**TABLE 6.1-21 (CONTINUED)**
**DISPERSION MODELING INUT PARAMETERS**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tankline 4 | 3.17 | 0.00005 | 0.38 | 0.000001 | 1.5 | 0.61 | 0.35 | 0.567 |
| Tanklines 7-10 | 10.15 | 0.00015 each | 0.000 | 0.000000 each | 1.5 | 0.61 | 0.71 | 0.567 |
| Subtotal | 517.39 | 0.0074 | 3.956 | 0.000057 | | | | |
| **Totals** | **30,774.53 lb/yr 15.39 tpy** | | **361.76 lb/yr 0.18 tpy** | | | | | |

## 6.1.6 PROJECTED IMPACTS TO AMBIENT OZONE LEVELS

The proposed project will result in emissions of volatile organic compounds. While VOCs are not regulated directly through ambient air quality standards, they participate in atmospheric reactions with oxides of nitrogen in the presence of sunlight to form ozone, which is a pollutant covered by the National Ambient Air Quality Standards. Kittitas is an attainment area for ozone. Most of the project=s emissions of VOCs will occur at the Kittitas facility due to releases from fuel storage tanks, the truck loading rack and leaking valves, flanges and other components throughout the facility. The measures that will be taken to control these emissions are described elsewhere in this Application (Section 6.1-4). Fugitive emissions of VOC from the pump stations planned at locations along the proposed pipeline route will be very small, (less than one ton per year per pump station), and are not addressed further in this discussion.

No ozone measurement data are available in Kittitas or in adjacent areas that could be considered representative of the air quality at the proposed gasoline terminal site. Likewise, the extensive information that would be needed to support photochemical modeling of the project=s ozone impacts, including detailed speciation data for existing VOCs sources in the project area and three-dimensional fields of meteorological parameters, are not available. In any event, the small magnitude of VOC emissions that will result from the proposed facility would not justify the considerable effort and expense that would be required for such sophisticated modeling.

With the information that is at hand, potential impacts of the Kittitas facility VOC emissions on local ozone levels can be shown to be insignificant in two ways. First, as described in the emissions inventory, the total VOC emissions of <16 tons per year and 0.08 tons per year of $NO_x$ (solely the result of weekly testing of a diesel firewater pump) are predicted for the maximum feasible facility throughput. These worst-case emission projections may be compared with the total VOC and $NO_x$ emissions in Kittitas County in the 1996 WDOE inventory, 4,897 and 4,259 tons per year respectively (WDOE, 1997), to demonstrate that the proposed project is incapable of causing any material increase on ambient ozone levels.

An alternate approach for evaluating the maximum potential effect of the Kittitas facility=s emissions on local ozone air quality was also used. This method uses the maximum predicted one-hour VOC concentration obtained by running the ISCST3 model with the emissions from all facility VOC sources and the full set of meteorological conditions that are used with the EPA SCREEN3 model. This set of simulations yielded a maximum predicted one-hour VOC concentration of 126.43 μg/m$^3$, which is projected to occur near the midpoint of the facility's western fenceline. For purposes of projecting maximum ozone impacts, we have assumed that this maximum one-hour VOC concentration consists entirely of gasoline vapors. Since ozone is a pollutant which is generally problematic only during the summer months, we assume that the distribution of chemical constituents in the predicted VOC concentration corresponds to that of summer blend gasoline.

Next, a weighted average reactivity factor for the gasoline mixture was calculated using the reactivity factors for the individual constituents listed for the "Maximum Reactivity Scenario" in the EPA Publication, Development of Ozone Reactivity Scales for Volatile Organic Compounds (Carter 1991). Reactivity data were identified in this publication for most of the summer blend gasoline constituents, accounting for about 90.2% of the gasoline vapor by weight. The remaining 9.8% of the mixture was assigned a reactivity equal to the weighted average value for all of the identified constituents and a new weighted average, including the contribution of this fraction, was calculated. The data used in developing an overall reactivity for predicted VOC concentrations in the vicinity of the Kittitas facility are shown in Table 6.1-22.

The reactivity values for each constituent compound in the EPA reference document are provided in units of grams of ozone formed per gram of emissions for that constituent. Thus, based on the results in Table 6.1-21, each gram of emitted gasoline vapor is assumed to result in the development of 1.09 grams of ozone in the atmosphere. In the case of the maximum VOC concentration for this facility, the micrograms predicted to occur in a one cubic meter volume of air at the facility boundary would result in the formation of 126 x 1.09 = 137 μg of ozone. However, the transformation of reactive compounds to ozone would occur during sunny conditions over a period of several hours, during which time the facility plume would be diluted several thousand-fold. For example, even for the most restricted turbulence conditions (Class F) and a light wind speed (2 mps), the cross-section of a Gaussian plume, as represented by the product of the plume's horizontal and vertical length scales ($\sigma_y$ x $\sigma_z$,), increases by a factor of about 8,000 during a two-hour transit time or 14 kilometer transit distance, (see Figure 4-1 in Turner, 1969). Thus, it would be reasonable to conclude that the 137 micrograms of ozone that may ultimately be generated by the 126 micrograms of VOC in a cubic meter of air at the fenceline would actually occur at a concentration of about 137 μg /8,000 cubic meters = 0.017 μg/m$^3$. For other less restrictive meteorological conditions, the incremental effect on ambient ozone concentrations would be even smaller.

While no baseline ozone concentration data are available for the project site, Kittitas County is an attainment area for this pollutant, where the maximum hourly concentration can be presumed to be below 235 μg/m$^3$. If the maximum ozone concentration in an area without the proposed project is at or below 234.97 μg/m$^3$, then no exceedance of the federal one-hour standard would be expected to occur. Thus, the controls for VOC emissions that are included in the design of the proposed facility at Kittitas will also ensure that the project's impacts on ambient ozone levels are negligibly small.

**TABLE 6.1-22**
**WEIGHTED REACTIVITY OF THE SUMMER GASOLINE MIXTURE FOR THE PROPOSED KITTITAS TERMINAL**

| Species | Weight Fraction[1] | Max Reactivity[2] (gr ozone/gr VOC) | Weighted Reactivity |
|---|---|---|---|
| benzene | 0.007 | 0.28 | 0.00196 |
| cis-butene | 0.009 | 7.2 | 0.0648 |
| cyclopentane | 0.007 | 1.6 | 0.0112 |
| cyclopentene | 0.002 | 3.9 | 0.0078 |
| isobutane | 0.0979 | 0.83 | 0.081257 |
| isomers of hexane | 0.047 | 0.92 | 0.04324 |
| isomers of pentane | 0.266 | 0.86 | 0.22876 |
| methylcyclohexane | 0.001 | 1.18 | 0.00118 |
| methylcyclopentane | 0.016 | 1.7 | 0.0272 |
| n-butane | 0.228 | 0.62 | 0.14136 |
| n-heptane | 0.003 | 0.5 | 0.0015 |
| n-hexane | 0.018 | 0.61 | 0.01098 |
| n-pentane | 0.085 | 0.64 | 0.0544 |
| propane | 0.012 | 0.33 | 0.00396 |
| toluene | 0.006 | 1.8 | 0.0108 |
| trans-2-butene | 0.012 | 7.2 | 0.0864 |
| 1-hexene | 0.002 | 3 | 0.006 |
| 1-pentene | 0.01 | 4.2 | 0.042 |
| 2-methyl-1butene | 0.019 | 3.7 | 0.0703 |
| 2-methyl-2-butene | 0.01 | 4.9 | 0.049 |
| 2,2-dimethybutane | 0.012 | 0.4 | 0.0048 |
| 2,4-dimethylpentane | 0.005 | 1.06 | 0.0053 |
| 3-methyl-1-butene | 0.004 | 4.2 | 0.0168 |
| 3-methylhexane | 0.023 | 0.94 | 0.02162 |
| unknown | 0.0981 | 1.0 (assumed) | .0981000 |
| Total | 1.000 | | 1.090717 |

[1] Speciation of gasoline vapors from California Air Resources Board publication ) -- Lisa to put in title of reference here

[2] Component species reactivity factors from Development of Ozone Reactivity Scales for Volatile Organic Compounds (Carter 1991).

### 6.1.7 SUMMARY OF AIR QUALITY IMPACTS AND REGULATORY COMPLIANCE

Pollutant emissions from the proposed facilities are limited to total VOCs, toxic air pollutants, and short-term emissions of air pollutants during construction.

#### 6.1.7.1 Kittitas Terminal

Analysis of pollutant emissions from the operation of the proposed facilities was limited to total VOCs and toxic air pollutants. Analysis of construction emissions include emissions from vehicle exhaust and fugitive emissions of particulates.

Emissions from the Kittitas Terminal equals 15.39 tons per year of VOCs, and measurable amounts of benzene greater than the SQER. Impacts of the emissions from the Kittitas Terminal, based on criteria for the purpose of this application, do not exceed air pollutant standards; therefore, impacts from the facility are considered low.

OPL is submitting an NOC to EFSEC as a result of these emissions and this application is included in Appendix D. EFSEC requires annual registration. Criteria pollutant emissions from the facility do not exceed thresholds requiring a PSD permit, or a major source Air Operating Permit as required by Title V of the CAAA. In addition, single and combined hazardous air pollutant emissions do not exceed trigger levels for Title III of the CAAA, showing compliance with all federal emission standards.

New Source Performance Standards (NSPS)(40 CFR 60, Subpart Kb) apply to operations at the Kittitas Terminal. The proposed design of the storage tanks include a fixed cone roof with internal floating roof, primary and secondary seals, and gasketed atmospheric vents. Inspection and maintenance of the tanks--including the roof, seals, and vents--are an integral part of the NSPS and shall be implemented at the facility. Routine inspection and maintenance is included in the Operations and Maintenance Plans for the facility.

Truck-loading operations must comply with 40 CFR 60 Subpart XX and state requirements. The truck rack will have dry break couplings on the loading arms eliminating product spills and vapor loss when decoupling the arms from the trucks. The trucks will also be submerged-filled using bottom loading, which also reduces vapor loss. All safety and vapor recovery equipment must be attached to the truck before loading of liquids commences. A vapor recovery system will be employed during loading operations as well. The vapor recovery unit will consist of carbon adsorption filters and associated equipment. At least 99.9 percent of the vapor emissions will be recovered and filtered through the unit. Product recovery from the unit will be recycled into the storage tanks. Trucks will also be leak-tested and vapor-tight, considerably reducing emissions lost during loading and transit. Records will be maintained on site of all tanks and leak testing.

#### 6.1.7.2  Pump Stations

Total VOCs emitted from pump stations are less than 1 ton per year and are considered insignificant by Ecology.  Pump stations located in Thrasher,  North Bend, and Stampede within jurisdiction of the Puget Sound Air Pollution Control Agency are not required to submit an NOC or register the emission source with the agency.  Impacts from the pump stations are considered insignificant.

#### 6.1.7.3  Construction

Emissions from construction will primarily result from earth-moving equipment, trenching, and backfilling operations along the pipeline route.  Fugitive dust emissions calculated for the construction spreads indicate that some impact may be unavoidable, despite the use of wet suppression methods to reduce emissions. Short-term emissions due to construction may be significant for vicinities close to the construction sites. However, the total number of receptors which will actually be affected are limited to populated areas along the pipeline route.  The majority of the pipeline route, including areas adjacent to the pump stations and bulk terminal, is located in unpopulated areas.  Thrasher and North Bend are more densely populated than other areas along the pipeline route, and thus impacts in these areas may be significant for short periods. Long-term impacts are not expected, due to the short nature of the construction phase.  Therefore, impacts to ambient air quality due to construction emissions are expected to be localized and short-term.

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